SERVICES FOR SCHOOLS

Diagnostic Mathematics Tasks

Year 2 summer term to Year 3 spring term

A set of half-termly mathematics tasks supporting diagnostic assessment to find gaps in pupil learning and inform teaching and planning.

Sample Copy

Contents

Introduction

This resource has been designed to support Year 2 and Year 3 teachers in using diagnostic assessment to inform teaching that addresses significant gaps in pupil learning. The booklet contains a series of mathematical questions/activities which enable teachers to progressively explore pupils' knowledge, conceptual understanding and skills from the end of the summer term in Year 2 to the spring term in Year 3. The tasks cover a range of mathematical domains including Number & Place Value, Calculation and Fractions.

How to use

The activities are intended to be used by class teachers or teaching assistants (under the direction of a class teacher), for short, focussed one-to-one pupil conferencing with pupils whose gaps in knowledge and conceptual understanding need a more forensic approach than might be possible in a whole class lesson.
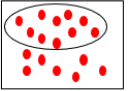
Each task has:

- some suggested questions focussed on both assessment of the pupils' subject knowledge and their reasoning to inform next steps in teaching
- the purpose for using the task with National Curriculum links
- common misconceptions (from spring term Y3)
- suggestions for next steps in learning

It is recommended that as one-to-one conferencing is intensive, that sessions last no more than 20 minutes. During the session, more than one task could be used to support discussion.

Understanding the layout of the Tasks

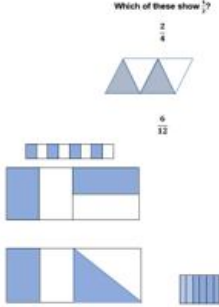Colour coded for ease of reference for different terms

Key task/mathematical activity for the pupil

Year 2 Summer Term: Key Task 1	Year 2 Summer Term: Key Questions	Year 2 Summer Term: Purpose
Counting objects and reading numbers: Provide a set of 2- digit numbers counters or other counting objects. Read this number: 17 Can you show me 17 cubes/counters and place them on a piece of paper? Can you draw a circle around the number of cubes that represent the 1 digit? Now choose resources to represent these numbers: 15, 12, 21	• Can you read the number on the card out loud? • How many counters are represented by the 7 digit/1 digit? • What does the 1 digit represent? What is it worth? • Which number is smallest/largest? • If you were to put them on a number line, where would they be? • Talk about why you have chosen the manipulatives/resources and represented the numbers in that way. **NB. Give children a copy of the task to reference throughout the pupil conferencing.**	*Pupils should:* • To recognise the place value of digits in 2-digit numbers [Year 2 NC] • To recognise the value of the ten in teen numbers which are particularly tricky. • identify, represent, and estimate numbers using different representations, including the number line. [Year 2 NC]. • read and write numbers to at least 100 in numerals and in words [Year 2 NC]. • Ability to reason and explain mathematical thinking **Next Step** • Ask pupils to write a selection of 2-

Purpose of task linked to National curriculum including non-statutory guidance.

Suggested next step

Key questions for class teacher/teaching assistant

Year 3 Spring Term: Key Task 4	Year 3 Spring Term: Key Questions	Year 3 Spring Term: Key Misconceptions
Which of these show $\frac{1}{2}$?	• How would you say the fractions $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{2}$? • What do the numbers within the fraction represent? • What can you tell me about how the fractions are written? • Can you use the resources or fraction wall to show me which are/are not equivalent? • How many other equivalents to $\frac{1}{2}$ can you write? • How could you check all parts are equal?	*Pupils should be able:* • To recognise, find and name fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ of a length, shape, set of objects or quantity. [Year 2 NC] **Pupils might:** • Read fractions comparing parts with parts, rather than parts out of a whole: for example, they many read 2 parts and 4 parts and write the fraction $\frac{2}{4}$ rather than 2 out of 6 • Not always recognise that the numerator and denominator have a proportional relationship so in 1 half for example, the numerator will be half of the denominator • Carry on patterns of equivalent fractions but do not always fully understand how they relate to multiplicative relationships. • Not understand that the parts must be equal **Next Steps** • Use fraction walls to find equivalent fractions • Show children a range of images where the fractional parts are the same in size but where there are different shaped parts (they are not congruent)

Common misconceptions from Spring term linked to National curriculum

Suggested next steps to help address misconceptions

What to look for

In addition to the key tasks, pupils should also have access to a range of concrete resources. For example; structured and unstructured laminated number lines, counters, place value counters, place value arrow cards, Dienes rods, Numicon coins, tens frames, hundred squares and digit cards. For some tasks squared paper may also be useful.

Teachers and teaching assistants should take this opportunity to observe how well individual pupils:

- explain their reasoning using appropriate vocabulary
- model the mathematics using a combination of the available concrete resources and informal jottings (pictures, number lines and part-part whole diagrams such as bar models)
- use formal notation, for example equations to show the operation(s) needed
- make decisions about when to solve calculations mentally and explain the strategy they have used
- can identify the steps needed to solve the problem in the most straightforward way

Year 3 Autumn Term 1: Key Task 3	Year 3 Autumn Term 1: Key Questions	Year 3 Autumn Term 1: Purpose
Fractions This image shows $\frac{1}{4}$ because 1 is coloured and 4 are not. True or false?	• Why do you think it is true/false? • Can you show me other ways of expressing $\frac{1}{4}$? • What fraction is coloured green? • What mistake has been made in the statement? • What fraction of the image is green? How do you know? • Can you write the fraction? • Can you count in quarters for me?	Pupils should be able to: • recognise and use fractions as numbers [Year 3] • recognise, find, name and write fractions of a length, shape, set of object or quantities. [Year 3].
		Next Step
		Can you draw as many images of a quarter as you can?

Year 3 Autumn Term 2: Key Task 3	Year 3 Autumn Term 2: Key Questions	Year 3 Autumn Term 2: Purpose
Multiplication and division Which bar model represents the problem? There are 3 bags of apples each with 5 in. How many are there altogether? <table><tr><td>5</td><td>5</td><td>5</td></tr></table> <table><tr><td>3</td><td>3</td><td>3</td></tr></table> <table><tr><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr></table> <table><tr><td>3</td><td>5</td></tr></table>	• Which bar model represents the problem? • Explain your choice. • Can you write a calculation to match the problem too? • What is the answer to the question? How did you calculate it? • Which bar could it be/not be? Why? • Can you think of problems that could match the other bar models? • Can you choose resources to act out the problem?	Pupils should be able to: • solve problems using; multiplication and division, materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts [Year 2 NC].
		Next Step
		Can you write a division question that matches the green, blue, and red bar models?