DRAFT: 2016 Mathematics, Reading and Science Key Stage 2 Teacher Assessment Performance Descriptors

Mathematics

Number and place value

- Solve problems and reason about place value and number
- Use place value in whole numbers to at least 10 000 000 to read, write, compare and order numbers
- Identify the value of each digit in numbers with up to 3 decimal places
- Round any whole number to the nearest 10, 100, 1,000, 10,000, 100,000
- Use approximation to estimate and check answers to calculations and determine, in the context of a problem, levels of accuracy
- Use negative numbers in practical contexts and solve problems, including calculating intervals across 0

Addition, subtraction, multiplication, division

- Use knowledge of the 4 operations to reason and to solve problems, including puzzles not set in a context (aims)
- Add and subtract mentally with increasingly large numbers
- Add and subtract whole numbers with more than 4 digits, using formal written methods
- Solve addition and subtraction multi-step problems in context

Recognise and use:
- multiples and factors ;
- prime numbers to at least 19; and
- square numbers, at least up to 144

- Use understanding of place value to multiply and divide whole numbers and decimals with up to 3 decimal places by 10, 100 and 1000
- Multiply and divide numbers mentally, drawing upon multiplication facts, including with mixed operations and large numbers
- Perform mental calculations including with mixed operations and large numbers
- Fluently multiply numbers up to 4 digits by a 2-digit number using the long multiplication method
- Fluently divide numbers with up to 4 digits by a 1-digit number using the formal written method
- Use long division with 2-digit divisors
- Interpret remainders according to the context
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, appropriate levels of accuracy

Fractions including decimals and percentages

- Solve problems and reason about fractions, decimals and percentages (aims)

Use to common factors to:
- simplify fractions;
- identify equivalent fractions, using common multiples to express fractions in the same denomination

- Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred'
- Recall and use equivalences between simple fractions, decimals and percentages, in different contexts
- Associate a fraction with division and begin to calculate decimal fraction equivalents
- Calculate simple fractions and percentages of whole numbers and quantities
- Add and subtract fractions with denominators that are multiples of the same number
- Convert and calculate between improper fractions and mixed numbers where appropriate for the context
- Fluently add and subtract decimal numbers and round when required to specified degrees of accuracy
- Multiply one-digit numbers with up to 2 decimal places by whole numbers
- Use written division methods in cases where the answer has up to 2 decimal places

Ratio and proportion

- Use simple ratio and proportional reasoning to solve problems
- Solve problems involving similar shapes where the scale factor is known or can be found

Algebra

- Use simple formulae in words, and express missing number problems algebraically
- Generate and describe linear number sequences
- Find possible values in missing number problems and equations involving 1 or 2 unknowns

Measurement

- Read, write and convert time between analogue clocks (including clock faces using Roman numerals) and digital 12- and 24-hour clocks, using am and pm where necessary
- Read Roman numerals to 1000 (M)
- Solve problems involving converting units of time, including problems involving the duration of events
- Use, read, write and convert between standard metric units of measure
- Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- Recognise that shapes with the same areas can have different perimeters and vice versa
- Estimate the area of irregular shapes by counting squares (including half squares and fractions of squares)
- Calculate and compare the area of squares and other rectangles including using standard units, square centimetres (cm²) and square metres (m²)
- Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate
- Reason and solve problems involving measures

Geometry – properties of shapes

- Solve problems and reason about shapes and their properties
- Compare and classify geometric shapes based on their properties and sizes
- Recognise, describe and build simple 3-D shapes, including using nets and other 2-D representations
- Draw 2-D shapes using given lengths and angles with increasing accuracy
- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
- Find unknown angles in triangles
- Illustrate and describe parts of circles including radius, diameter and circumference

Geometry – position and movement

- Draw and translate simple shapes on the co-ordinate plane in the first quadrant
- Describe positions of a 2-D grid as co-ordinates in the first quadrant
- Use reasoning to solve problems related to co-ordinates, reflections and translations

Statistics

- Present, complete, read and interpret information in tables and bar charts
- Construct and interpret line graphs, interpret pie charts and use both to solve problems
- Calculate and interpret the mean as an average for simple sets of discrete data in different contexts

Reading

Word Reading

- Fluently and effortlessly reads a range of age appropriate texts, including novels, stories, plays, poetry, non-fiction, reference books and text books
- Determines the meaning of new words by applying knowledge of the root words, prefixes and suffixes as listed in 'English programmes of study: key stages 1 and 2 National curriculum in England - Appendix 1'
- Demonstrates appropriate intonation, tone and volume when reading aloud text, plays and reciting poetry, to make the meaning clear to the audience

Comprehension

- Demonstrates a positive attitude to reading by frequently reading for pleasure, both fiction and non-fiction
- Has read and demonstrates familiarity with a wide range of books, including myths, legends and traditional stories, modern fiction and fiction from literary heritage, and books from other cultures and traditions
- Recommends books to others based on own reading preferences, giving reasons for choice
- Has learned a wide range of poetry by heart
- Explains how language, structure, and presentation, can contribute to the meaning of a text
- Draws on contextual evidence to make sense of what is read, and participates in discussion to explore words with different meanings
- Comments on how language, including figurative language, is used to contribute to meaning
- Asks questions to enhance understanding of the text
- Is able to make comparisons within and across different texts
- Draws inferences such as inferring characters' feelings, thoughts and motives from their actions, and justifying inferences with evidence
- Makes predictions based on details stated and implied
- Distinguishes between statements of fact and opinion; and in non-fiction
- In non-fiction, retrieves records and presents information to the reader
- Identifies key details that support main ideas, and uses them to summarise content drawn from more than one paragraph
- Expresses views formed through independent reading and books that are read to them, explaining and justifying personal opinions, and courteously challenging those of others
- Explains and discusses their understanding of what they have read, including through formal presentations and debates, maintaining a focus on the topic and using notes where necessary
- Identifies themes and conventions demonstrating, through discussion and comment, understanding of their use in and across a wide range of writing

Science

Working scientifically

- While studying the content of biology, chemistry and physics, a pupil at the national standard is able to work scientifically by using first-hand practical experiences and a wide range of sources of information to develop a deeper understanding of a wide range of scientific ideas. This means they are able to:
- explore and talk about their and other people's ideas
- analyse functions, relationships and interactions systematically
- begin to recognise how abstract ideas help them to understand and predict how the world operates
- begin to recognise that scientific ideas change and develop over time
- ask their own questions about scientific phenomenon and select and plan the most appropriate ways to answer science questions using different types of scientific enquiry, including:
  - observing changes over different periods of time
  - noticing patterns
  - grouping and classifying things
  - carrying out comparative and fair tests
  - finding things out using a wide range of secondary sources of information
- select the most appropriate equipment for a task and take accurate measurements or readings using the appropriate units as required
- identify when to repeat measurements, if necessary, to ensure given results are reliable
- draw conclusions based on their data and observations
- use evidence from a range of sources to justify their ideas
- use their scientific knowledge and understanding to explain their findings through talk, in written forms or in other ways
- recall and use appropriate terminology when working scientifically (at least: accurate, conclusion, evidence, fair test, prediction, reliable, supports (evidence), variable, unit) as well as the scientific language and terminology found in the different areas of science
- read, spell and pronounce scientific vocabulary correctly at a level consistent with their word reading and spelling knowledge at key stage 2

Biology - Structure and function

- name, locate and describe the functions of the main parts of the digestive, musculoskeletal, and circulatory systems in animals
- describe the effects of diet, exercise, drugs and lifestyle on how their bodies function in the long and short term
- describe the reproductive process in some animals and differences in their life cycles (at least: mammals, amphibians, insects, birds)
- name, locate and describe the functions of the main parts of plants, including those in the reproductive system and how water and nutrients are transported
- describe how plants are affected by their environment and changes to growing conditions

Biology - Evolution and inheritance

- describe how fossils are formed, and how they provide some evidence for evolution
- use the ideas of inherited characteristics, variation between offspring and adaptation to their environment to describe how living things may have changed over time and evolved

Biology - Interdependence

- use keys to group, classify and identify living things in different ways based on first hand observation or secondary information sources
- describe the main characteristics used to group plants, animals and micro-organisms according to the main groups in the classification system
- construct and interpret food chains
- explain how wider environmental changes may have an impact on living things

Chemistry - States of matter

- compare the characteristics of different states of matter (solids, liquids and gases)
- describe how materials can change state (with reference to temperature), using this to explain everyday phenomena, including the water cycle, based on first-hand observation of changes of state

Chemistry - Properties of materials

- group, classify and identify materials, including rocks, in different ways according to their properties (at least: appearance, hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets), based on first-hand observation
- describe the advantages and disadvantages of everyday materials for different uses, based on an understanding of their properties and from evidence from scientific enquiries
- describe the composition of soil

Chemistry - Changes in materials

- identify and recognise everyday phenomena where dissolving occurs
- describe how to appropriately separate different mixtures of materials, including solutions
- identify when changes of materials are reversible or non-reversible and explain how they know

Physics - Light and sound

- use the idea that light from the sun and other light sources or reflections, enters our eyes to explain how we see and represent this in simple diagrammatic form
- use the idea that light travels in straight lines to explain the path of light when it is reflected, and the formation, shape and size of shadows
- use the idea that sounds are associated with objects vibrating, and that they require a medium to travel through, to explain how sounds are made and heard
- describe the patterns in sounds, relate how they are produced, and the distance from the source, to their pitch and volume

Physics - Forces and magnets

- use the idea that different forces have different effects on objects, and recognise that some forces (air resistance, water resistance, friction) involve contact between objects and others (gravitational and magnetic) do not
- identify common materials which are magnetic
- use the idea of like and unlike magnetic poles to predict the behaviour of magnets

Physics - Electricity

- use simple apparatus to construct and control, first-hand, a series circuit (involving at least: cells, wires, switches, bulbs and buzzers), and describe how the circuit may be affected when changes are made
- use recognised symbols (at least: cells, wires, switches, bulbs, buzzers and motors) to draw and interpret simple series circuit diagrams
- recognise common conductors and insulators

Physics - Earth and space

- describe the shape of bodies in the solar system and their movement relative to each other
- use the Earth's movement in space to explain day and night and the apparent movement of the sun across the sky

Key:

Mathematics	
Reading	
Science	
Text in bold is main criteria	
Text not in bold in a pale background is sub criteria	