



Performance descriptors for use in key stage 1 and 2 statutory teacher assessment for 2015 / 2016

SCORE's response to the Department for Education consultation.

18 December 2014

1. Introduction

SCORE is a partnership of organisations, which aims to improve science education in UK schools and colleges by supporting the development and implementation of effective education policy. The partnership is currently chaired by Professor Julia Buckingham and comprises the Association for Science Education, Institute of Physics, Royal Society, Royal Society of Chemistry and Society of Biology.

2. In summary:

- a. The Department for Education should produce further guidance on the purpose of the performance descriptors.
- b. The performance descriptors set out the minimum standard of scientific experience students should be exposed to during primary school. All primary school students should have enriched experiences in science. Teachers should focus on creating engaging teaching in a way that reflects the practical and theoretical nature of the disciplines.
- c. SCORE supports the use of just one “working at the national standard” level. However, Department for Education guidance should encourage teachers to let students study in greater depth within the same key stage if they are working beyond the performance descriptors. As there is only one level of mastery the performance descriptors need to be more explicit and mention key vocabulary, which they often fail to do.
- d. SCORE does not think it advisable to have such a complex system of different levels of descriptors (e.g. ‘mastery level’) for other subjects. This causes unnecessary confusion for parents, children and teachers.
- e. The performance descriptors should be redrafted to ensure the headings and language mirror the National Curriculum. This is of particular importance because teachers could use the performance descriptors to guide their work as well as the National Curriculum, so there needs to be a consistency of approach between the documents. SCORE has suggested amendments in Appendix A.
- f. Teachers will need to engage with professional development to ensure they are equipped to assess student performance in biology, chemistry and physics accurately, in a way which is helpful to their colleagues in secondary schools, and in a way which gives students a rich and rewarding experience in the sciences. Teachers will also need to be provided with adequate exemplar materials to guide their assessment work.
- g. Giving students the skills to work scientifically is an extremely important part of primary science and should be weighted appropriately in the performance descriptors.

3. Naming the draft performance descriptors

- a. The language used in the performance descriptors is helpful and encourages exploration rather than rote learning. But it should more closely mirror that used in the National Curriculum. For example words such as method, fair and reliable, which are now removed from the National Curriculum at key stages 1 and 2, appear in the performance descriptors and should be removed.
- b. We understand and are happy that the headings and statements in the draft performance descriptors are an attempt to help teachers provide learning opportunities around the big ideas of science, as the programme of study statements are difficult to track progressively across the years and key stages. However, where possible, there should be consistency between the statements in the two documents and any variance should be explained. For example the National Curriculum makes no reference to 'biology', 'chemistry' and 'physics', beyond the introduction. The performance descriptors do not need those distinctions in the headings.
- c. Additionally, it would be useful for teachers when developing their own tracking systems to provide hyperlinks, with exemplification, between the statements in the performance descriptors and programmes of study and to reference them using a numbering system based on that which is already in place for the test descriptor with the programme of study.

4. Using the performance descriptors to support accurate and consistent judgements

- a. We are concerned that there are different numbers and levels of draft performance descriptors for different core subjects and at different key stages. There is no obvious rationale behind this, and this will create an overly complicated situation for teachers to work within and across subjects when making effective and consistent assessments. Science has only one performance indicator – national standard – at both KS1 and KS2, compared with reading, writing and mathematics at KS1 (four standards including mastery) and writing at KS2 (five standards including mastery and above national standard, as well as national standard). We would like to see one national standard applied consistently across all subjects at both key stages to avoid the unintended consequences found in the previous complex assessment system when teachers worked with many levels.
- b. The use of a single “working at the national standard level” for science means teachers will need to develop their own ways of demonstrating that their students are working beyond the performance descriptors.
- c. It is possible that some teachers, schools and local authorities will judge a student's achievement in the sciences based on the percentage of the performance descriptors they have mastered, rather than ensuring students have a rich and rewarding experience of learning through all the actions described in the performance descriptors. Teachers will need guidance on how to make and report the overall judgment, beyond mastery. SCORE believes those students working beyond the performance descriptors should study the same content but at greater depth, with more time for exploration, instead of an immediate move to the key stage 3 programme of study.

- d. Assessing students using the performance descriptors should not become a burden for teachers. They should be used to summarise attainment judgments made over the key stage.
- e. There is a danger that if pupil progress is not tracked well from year to year, and effective teaching has not taken place, any shortfall in knowledge and attainment will have to be made up in Year 2 and Year 6. Some science subject leaders may divide the performance descriptors into different years of teaching, creating a risk that pupils do not get a rich experience of working scientifically throughout their time at primary school.

5. Clarity of the performance descriptors

- a. Teachers do not yet know how they will present the performance descriptor data. Some are working with other schools to carry out local moderation, but they are likely to adopt different strategies for presenting and communicating. Schools will welcome the freedom to record individual progress, but this makes comparability of national standards almost impossible.
- b. Primary school teachers will need to agree with secondary school colleagues the best way to communicate performance descriptor information when pupils progress to key stage 3.

6. The content of the performance descriptors

- a. It is possible that the performance descriptors will be used by teachers as an alternative to the National Curriculum programme of study. While the two documents should have different purposes, this means the descriptors need to be comprehensive and closely matched to the National Curriculum, allowing for consistency between the documents. All the content that has to be taught as a statutory requirement in the programme of study needs to be represented in the performance descriptors. In the draft documentation, there are some notable absences. For detailed amendments suggested by SCORE please see appendix A.
- b. We understand and are happy that the 'working scientifically' performance descriptors mainly draws on statements from the (statutory) introductory text of the programme of study which is often not considered by teachers. Drawing on these statements helps to provide greater clarity on what is expected from children who are working at the national standard in this area. SCORE has suggested some changes in appendix A.

7. Weighting of the performance descriptors

At primary school level it is vitally important that students learn how to work scientifically, and this section of the performance descriptors for key stages 1 and 2 should carry the most weighting.

8. Implementation

1. Professional development

- a. Teachers will need to be trained to assess pupils in science and carry out moderation with local colleagues. Moderation is the best way of securing consistent judgements across and

between schools, but this needs to be supported through professional development and good quality exemplar materials.

- b. This professional development will need to be available to all teachers and be subject specific if these performance descriptors are to be used successfully.

2. *Piloting the performance descriptors*

- a. SCORE is concerned that the Department for Education will not have enough time to monitor this purely in the summer period. Starting the trial in summer 2015 does not leave time to resolve any issues, and piloting the performance descriptors in this way will only show if the descriptors match what teachers are currently producing under the new curriculum.

3. *Exemplar material*

- a. The Department for Education should produce guidance on the depth of understanding required for each performance descriptor statement, including what “mastering the majority” means. There is a risk that teachers will struggle without good guidance on how to use the statements in the performance descriptors. Without the statutory test for science, it would not be easy to identify and record pupils working above the national standard, and as a result this might be interpreted as a dumbing down of science. The Department for Education should not try to map data from the performance descriptors against the national standards, this is the purpose of the national sampling tests.
- b. SCORE would welcome further information on the nature and source of the exemplar material due to be produced, and the quality assurance processes and networks the Department for Education plans to use to ensure teachers see and use the material effectively.

Appendix A

These are detailed comments and suggested amendments to the performance descriptors from SCORE, organized by the headings used in the draft version.

Where possible, there should be consistency between the statements in the National Curriculum and the Performance Descriptors. The National Curriculum programme of study makes no reference to 'biology', 'chemistry' and 'physics', beyond the introduction. The performance descriptors do not need those distinctions in the headings.

Key stage 1

Working scientifically

- The statements on looking closely at the natural and humanly-constructed world and observing phenomena are too vague.
- As they are easy to assess "observing and looking closely" should not be separate actions in the performance descriptors.
- The National Curriculum programme of study specifies that students should ask "simple" questions, but the wording in the performance descriptor is different. Students of all ages should be encouraged to ask questions, and it should not be assumed that KS1–2 students will only ask 'simple' questions, or that their questions will have 'simple' answers.
- "finding things out using secondary sources of information" is not in the National Curriculum programme of study.
- More guidance is required on how students should communicate ideas in a variety of ways.
- The use of the terminology *method, observe, pattern, results, measure, compare, record, group, equipment and fair* is not specified in the programme of study.

Chemistry - Properties of materials

- The performance descriptors do not ask that students describe the simple physical properties of a variety of everyday materials, raise and answer questions about everyday materials describe how some materials are used for one thing, or different materials are used for the same thing. They should do so.

Chemistry - Changes in materials

- Forces and sound are not part of the key stage 1 curriculum.

Biology – Structure and Function

- Students describing the basic needs of plants for survival and how changing these affects the plant should have to make reference to the impact of water, light and temperature.
- Students describing seasonal changes across all seasons should have to make reference to living things, weather, day length and temperature.

Biology – Interdependence

- Students should have to identify fungi and invertebrates including annelids, arthropods and molluscs using their familiar names.

Key stage 2

Working scientifically

For the working scientifically descriptor for key stage 2 pupils should begin to recognise some questions are not amenable to scientific investigation and that scientific ideas change and develop over time

- The performance descriptor should ask students to:
 1. recognise and control variables where necessary.
 2. record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
 3. use test results to make predictions to set up further comparative and fair tests.
 4. report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations

Chemistry - States of matter

- The performance descriptor should ask for students to:
 1. be able to compare and group materials together, according to whether they are solids, liquids or gases.
 2. describe the different states of matter.
 3. compare, group, classify and identify materials.
- The performance descriptor which asks students to describe the composition of soil should be altered, or embedded elsewhere, as it is too vague.

Chemistry - Changes in materials

- The performance descriptor should read: “identify and recognise everyday phenomena where dissolving occurs to form a solution”.
- The performance descriptor describing different mixtures of materials should include a
- specific reference to filtering, sieving and evaporating.
- The performance descriptor describing changes in materials should ask students to explain that some changes result in the formation of new materials.

Physics – Forces and magnets

- The level of detail required here is unclear and it is important that teachers are aware that numerical values and calculations are not required, particularly as they are

commonly used in examples. The relationship between an increasing length/number of pulleys/number of gears and a reduced load as a qualitative relationship could perhaps be articulated more clearly. Similarly the relationship with distance needs to be articulated, if that is required.

Physics - Earth and space

- The meaning of the performance descriptor which ask students to “describe the shape of bodies in the solar system and their movement relative to each other” is not clear. Is this a reference to the difference in shape of planets and asteroids, and does this mean movement relative to the sun?
- Students should have to use the Earth’s movement in space to explain day and night and the apparent movement of the sun across the sky.

Biology – Structure and Function

- Students should be able to identify producers, predators and prey