Links to national curricula Form A

Progress Test in Science (PTS) has been designed to sample the main science knowledge and skills set out in the national curricula for England, Wales, Scotland and Northern Ireland. While the intentions are similar, the science curricula vary between regions, for example in the terminology used. This document provides additional information on the test questions and their links to regional science skill sets.

Reporting areas

Learning in science comprises scientific knowledge as well as the skills and understanding needed to apply knowledge in different contexts.

To capture the different aspects of learning, the questions in *PTS9* have been mapped to three reporting areas:

Reporting area	Questions
Knowledge and Understanding • Recognising, recalling and showing understanding of scientific knowledge	1, 2, 3, 4, 5, 8, 14, 16, 21, 23, 24, 26, 28, 29, 30, 31, 32, 33, 36, 38, 39
Application of Knowledge and Understanding • Application of scientific knowledge and understanding, including that related to issues, uses and implications • Understanding of the nature, processes and methods of science through different types of science enquiries to help answer scientific questions about the world	6, 7, 9, 10, 11, 12, 13, 15, 17, 18, 19, 20, 22, 25, 27, 34, 35, 37, 40, 41, 42, 43, 44

Working scientifically
• Key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions
  ○ Observing over time, pattern seeking, identifying, classifying and grouping, controlled investigations, researching using secondary sources
  ○ Collecting, analysing and presenting data
	6, 7, 8, 9, 10, 11, 13, 17, 18, 19, 20, 22, 25, 37, 40, 41, 43, 44

The reporting areas shown above are based on the National Curriculum in England Science programmes of study for KS1 and KS2. The curricula for Wales, Scotland and Northern Ireland have similar requirements, although there is wide variation in the way they are defined.

Knowledge and skills

The question by question analysis in *PTS* reports provides detailed information on how students perform in the scientific disciplines of biology, chemistry and physics. The following tables map the test questions to the different regional curriculum content categories.

Some test questions may reflect content from previous years to ensure that knowledge has been embedded and progress is made across the range of scientific knowledge and skills. There are also some advanced questions to ensure that the more able pupils are challenged.

England

Aspects of the National Curriculum in England for KS1 and KS2 relevant to *PTS*9.

Biology

Animals including humans, living things and their habitats, plants

Concluding, planning, carrying out, recording

- Construct and interpret a variety of food chains, identifying producers, predators and prey
- Identify the different types of teeth in humans and their simple functions
- Describe the simple functions of the basic parts of the digestive system in humans
- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant
- Recognise that environments can change and that this can sometimes pose dangers to living things
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- Recognise that living things can be grouped in a variety of ways
- Asking relevant questions and using different types of scientific enquiries to answer them
- Using straightforward scientific evidence to answer questions, or to support their findings
- Setting up simple practical enquiries, and comparative and fair tests
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

Questions

12, 13, 14, 15, 16, 25, 26, 27, 28, 29, 40, 41, 42, 43, 44

Chemistry

States of matter

Carrying out, concluding, measuring, planning, recording

- Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- Compare and group together materials according to whether they are solids, liquids or gases
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Setting up simple practical enquiries, and comparative and fair tests
- Asking relevant questions and using different types of scientific enquiries to answer them
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Questions

7, 8, 9, 10, 11, 20, 21, 22, 23, 24, 36, 37, 38, 39

Physics

Electricity, sound

Concluding, measuring, planning, recording

- Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- Recognise some common conductors and insulators, and associate metals with being good conductors
- Recognise that vibrations from sounds travel through a medium to the ear
- Identify how sounds are made, associating some of them with something vibrating
- Find patterns between the volume of a sound and the strength of the vibrations that produced it
- Find patterns between the pitch of a sound and features of the object that produced it
- Recognise that sounds get fainter as the distance from the sound source increases

- Use straightforward scientific evidence to answer questions, or to support their findings
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment – including thermometers and data loggers
- Asking relevant questions and using different types of scientific enquiries to answer them
- Recording findings using simple scientific language, drawings, labeled diagrams, keys, bar charts and tables

Questions

1, 2, 3, 4, 5, 6, 17, 18, 19, 30, 31, 32, 33, 34, 35

Wales

Aspects of the National Curriculum in Wales for KS2 relevant to *PTS9*.

How things work

Electricity, sound

Concluding, patterns in data, recording

- Uses of electricity and its control in simple circuits
- How different sounds are produced and the way that sound travels
- Observations or measurements that need to be made
- Make comparisons and identify and describe trends or patterns in data and information
- Communicate clearly by speech, writing, drawings, diagrams, charts, tables, bar charts, line graphs, video and ICT packages, using relevant scientific vocabulary

Questions

1, 2, 3, 4, 5, 6, 17, 18, 19, 30, 31, 32, 33, 34, 35

Interdependence of organisms

Food chains, human health, human organs, identifying organisms, organisms in their environment

Carrying out a fair test, finding information, patterns in data, recording

- The interdependence of living organisms in environments and their representation as food chains
- The need for a variety of foods and exercise for human good health
- The names, positions, functions and relative sizes of a human's main organs
- The environmental factors that affect what grows and lives in two different environments, e.g. sunlight, water availability, temperature
- Identify through fieldwork the plants and animals found in two contrasting local environments, e.g. identification, nutrition, life cycles, place in environment
- Where and how to find relevant information and ideas
- When carrying out a fair test, the key variables that need to be controlled and how to change the independent variable whilst keeping other key variables the same
- Communicate clearly by speech, writing, drawings, diagrams, charts, tables, bar charts, line graphs, videos, and ICT packages, using relevant scientific vocabulary

Questions

12, 13, 14, 15, 16, 25, 26, 27, 28, 29, 40, 41, 42, 43, 44

The sustainable Earth

Features and properties of materials, units, how materials are formed

Using equipment, concluding, carrying out a fair test, recording

- A comparison of the features and properties of some natural and made materials
- How some materials are formed or produced
- Use standard measures and S.I. units, e.g. kg, s, N, m
- Make comparisons, and identify and describe trends or patterns in data and information
- Identify the equipment and techniques required for an enquiry
- When carrying out a fair test, the key variables that need to be controlled and how to change the independent variable whilst keeping other key variables the same
- The observations and measurements that need to be made

Questions

7, 8, 9, 10, 11, 20, 21, 22, 23, 24, 36, 38, 39

Scotland

Aspects of Curriculum for Excellence: Sciences experiences and outcomes for First and Second levels relevant to *PTS9*.

Biological systems

Bodily systems and cells

Concluding

- By investigating some bodily systems and potential problems which they may develop, I can make informed decisions to help me to maintain my health and wellbeing

Questions

25, 28, 29, 41

Forces, electricity and waves

Electricity, forces, vibrations and waves

Concluding, recording, scientific questioning

- I can describe an electrical circuit as a continuous loop of conducting materials. I can combine simple components in a series circuit to make a game or model
- To begin to understand how batteries work, I can help to build simple chemical cells using readily available materials which can be used to make an appliance work
- By investigating how friction, including air resistance, affects motion, I can suggest ways to improve efficiency in moving objects
- Through research on how animals communicate, I can explain how sound vibrations are carried by waves through air, water and other media
- By collaborating in experiments on different ways of producing sound from vibrations, I can demonstrate how to change the pitch of the sound

Questions

1, 2, 3, 4, 5, 6, 17, 18, 19, 30, 31, 32, 33, 34, 35

Materials

Earth's materials, units, properties and uses of substances

Concluding, recording, using equipment

- Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses
- By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed
- Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges

Questions

7, 8, 10, 20, 22, 23

Planet Earth

Biodiversity and interdependence, processes of the planet

Carrying out a fair test, concluding, scientific questioning, recording

- I can apply my knowledge of how water changes state to help me understand the processes involved in the water cycle in nature over time
- I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area
- I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction
- I can help to design experiments to find out what plants need in order to grow and develop. I can observe and record my findings, and from what I have learned I can grow healthy plants in school

Questions

9, 11, 12, 13, 14, 15, 16, 21, 24, 26, 27, 36, 38, 39, 40, 42, 43, 44

Northern Ireland

Aspects of National Curriculum in Northern Ireland for KS1 and KS2 relevant to *PTS9*.

Change over time

Change in the natural world, change over time in places, ways in which change occurs

Exploration, memory and understanding

- The effects of heating and cooling
- How changes in state can be brought about
- The relevance of the water cycle
- Note similarities and differences, and sort into groups, for example, different types of animals, properties of everyday materials or existing solutions to technological designs
- Make observations, use the senses and appropriate instruments to describe objects and events using relevant scientific terminology, for example, flexible, opaque or decay
- Take time to consider ways in which they can explore their own and others' questions and invent different methods for investigation

Questions

9, 10, 11, 36, 39

Interdependence

Living things in the natural world, interaction in the world

Developing a line of reasoning, exploration, memory and understanding

- Understand the interdependency that exists in simple food chains and webs
- The variety of living things and the conditions necessary for their growth and survival
- How lifestyle choices can affect their own and others' health
- Investigate similarities and differences, for example, comparing how things work, differences among animals and plants or properties of materials
- Take time to consider ways in which they can explore their own and others' questions and invent different methods for investigation
- Interpret results by identifying patterns and relate their conclusions to their scientific knowledge and understanding
- Note similarities and differences, and sort into groups, for example, different types of animals, properties of everyday materials or existing solutions to technological designs

Questions

12, 14, 15, 28, 40, 41, 42

Movement and energy

Causes and effects of energy

Exploration, developing a line of reasoning

- That a complete circuit is needed for a device to work
- That some materials do not allow electricity to pass and these are called insulators
- That some materials do allow electricity to pass and these are called conductors
- Push and pull forces can make things start and stop moving
- That there are different ways to make sounds
- That when an object vibrates, sound is produced
- Take time to consider ways in which they can explore their own and others' questions and invent different methods for investigation
- Interpret results by identifying patterns, and relate their conclusions to their scientific knowledge and understanding"

Questions

1, 2, 3, 4, 5, 6, 19, 30, 31, 32, 33, 34, 35

Place

Change over time in places, how place influences the nature of life, plant and animal life

Developing a line of reasoning, making decisions and solving problems, memory and understanding, questioning and planning

- That living things in any given place can be sorted into plants and animals
- How changes in state can be brought about
- Compare and group together materials according to whether they are solids, liquids or gases
- Simple food chains in different places
- The position of the major organs in the body and their importance for life
- What plants need in order to grow
- Interpret results by identifying patterns and relate their conclusions to their scientific knowledge and understanding
- Suggest how to make a test fair, identifying what should be changed, measured and kept the same
- Make observations, use the senses and appropriate instruments to describe objects and events using relevant scientific terminology, for example, flexible, opaque or decay
- Make suggestions about what, when and how to measure

Questions

8, 16, 20, 21, 23, 24, 26, 27, 29, 38, 43, 44

Feedback to parents and carers

A report on the individual pupil is available to support feedback to parents or carers. This *Individual report for parents* strips away much of the technical detail that is included in the *Group report for teachers*. A series of statements, tailored for parents, is included to explain what the results mean and how learning may be affected. Recommendations focus on how the parent or carer can work with the school to support the pupil at home.

In addition to the *Individual report for parents*, you may wish to provide supporting information, either orally or in writing, explaining the process and outcomes. The following list provides you with guidelines to assist with this communication.

- Stress the school's commitment to identifying and addressing the needs of each individual pupil in order to understand and maximise their potential.
- Explain that testing with *PTS9* is part of the school's regular assessment regime and that all pupils in the year group(s) have been tested.
- As part of the test, pupils were tested on their science knowledge and skills.
- You may wish to summarise the specific outcomes and recommendations from the test for that individual pupil (which are also shown on the *Individual report for parents*).
- Parents or carers should be reassured that if they have any questions or concerns or would like any further advice on how best to support their child, then they should contact the school.

A sample letter is provided (Figure 1) to support your communications with parents/carers after testing with *PTS9*.

Figure 1: Sample parent/carer feedback letter

Dear Parent or Carer,

In school, we wish to assess all our pupils to see what their needs are and how we can best help them learn and achieve.

As part of this process, your child has completed the *Progress Test in Science 9*, which assesses key aspects of science knowledge and skills.

A copy of the Individual report for parents is included*. This shows your child's results and describes what these mean in terms of the ways in which he/she will learn best and how you can support him/her at home.

[If the report is not included a relevant short extract can be included instead.]

If you have any queries or concerns please contact us.

Yours faithfully,

[School/Establishment name]

*If possible, it is helpful to parents to discuss the report with them on a suitable occasion before sending it out.