

HLTA (secondary science) Subject knowledge and skills review

It is envisaged that candidates will make use of this subject knowledge and skills review (SKSR) at the point of deciding to pursue HLTA status where subject specialism in science is being claimed for standard 10. Candidates are advised to work with a colleague in the science department during or following the completion of this tool, as this will not only serve to ensure an accurate self-evaluation but also support the verification of their knowledge at the point of assessment.

In completing this SKSR candidates should refer to www.qca.org.uk where the programmes of study covered within its content are fully illustrated.

The completed SKSR may provide evidence to the HLTA assessor that the candidate has acquired sufficient knowledge of science to adequately support teaching and learning within the department. This document can therefore also identify what action the candidate should take next to acquire further knowledge. As such, it could provide helpful evidence for standard 7.

This tool is intended to identify where there are strengths in knowledge, and where there are areas that require development, either through in-school activity or through a delivered training programme.

Key:

- 0: No knowledge** Candidate is unable to offer any support to pupils in this area
- 1: Very limited knowledge** Candidate is unable to offer reliable support to pupils in this area
- 2: Developing knowledge** Candidate would be able to offer a degree of initial support for pupils with guidance
- 3: Secure knowledge** Candidate is able to develop pupils' understanding of this concept with accuracy, confidence and abilities

Core knowledge	Initial level of understanding (0–3)	Candidate's notes on how knowledge was acquired (eg. you might note personal study, dates of coverage during training programme or in-school CPD)	Final level of understanding (0–3)
Health and safety			
1. Have read and understood the departmental health and safety policy			
2. Know where to locate reference material for health and safety, eg. remedial aid, CLEAPSS CD-ROM			
3. Have followed the departmental health and safety policy when planning and delivering a lesson (to include a practical activity)			

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Practical skills			
1. Understand the process of risk assessment, aware of hazards and where to go for further help regarding health, safety and risk assessment			
2. Can prepare a microscope slide and use a microscope effectively			
3. Aware of the hazards associated with chemicals used in schools and able to handle chemicals safely when carrying out a neutralisation reaction			
4. Can set up series and parallel circuits and deal with faults in simple circuits			

5. Can carry out an effective demonstration – eg. the alkali metals in water			
6. Can use a data-logger to monitor temperature changes in insulated and non-insulated beakers of hot water			

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Key concepts			
1. Confident to use ideas and models to explain phenomena and developing them to generate and test theories			
2. Understand how scientists interpret data and think creatively to test ideas and develop theories			
3. Can critically analyse and evaluate evidence from observations and experiments			

<p>4. Can identify different methods of collecting scientific data (examples to include primary and secondary sources)</p>			
<p>5. Aware of situations when there are questions that science cannot currently answer or address</p>			
<p>6. Understand that applying scientific ideas brings about technological developments and consequent changes in the way people think and behave</p>			
<p>7. Aware of the ethical and moral implications of using and applying science (examples include stem cell research, human genome project) and the social, economic and environmental effects of decisions about science</p>			

<p>8. Consider the benefits, drawbacks and risks of contemporary scientific and technological developments</p>			
<p>9. Recognise that modern science has its roots in many different societies and cultures and draws on a variety of valid approaches to scientific practice</p>			
<p>10. Understand that scientists share developments and common understanding across the disciplines and boundaries (examples include discussing how scientists around the world work together and communicate, eg. on the Human Genome Project)</p>			
<p>11. Aware of examples of how uncertainties in scientific knowledge and ideas can change over time (examples may include developing understanding of the solar system)</p>			

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Key processes			
1. Can plan to test a scientific idea, answer a scientific question or solve a scientific problem			
2. Able to collect data, both qualitative and quantitative, from primary sources including the use of ICT resources			
3. Can collect appropriate data from secondary sources, including the internet			
4. Able to carry out safe and accurate practical work			
5. Can evaluate methods of data collection, including consideration of the accuracy and reliability of the evidence			

6. Can present findings from scientific investigation in a number of ways (including description of observations, tables and graphs)			
7. Can analyse and interpret scientific information or ideas			
8. Can develop an argument and a scientific conclusion using scientific language, conventions and symbols			
9. Able to evaluate scientific evidence			

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Energy, electricity, forces and radiations			
1. Aware that energy can be transferred usefully, stored or wasted but cannot be created or destroyed			
2. Can calculate the efficiency of energy transfers			
3. Understand the magnetic effects of an electric current			
4. Understand that forces are interactions between objects and can affect their shape and motion			
5. Can perform calculations of pressure and moments			
6. Understand that electricity in circuits can produce a variety of effects and how current and voltage in series and parallel vary			

7. Understand that electrical power is readily transferred and controlled, and can be used in a range of different situations			
8. Understand the properties and behaviour of light			
9. Understand the properties and behaviour of sound			
10. Aware of renewable energy resources and emerging technologies such as fuel cells			
11. Aware that radiations, including ionising radiations, can transfer energy			
12. Know the uses of radiations (in the form of waves) for communications			

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Chemical and material behaviour			
1. Aware that the particle model provides explanations for the different physical properties and behaviour of matter			
2. Know that elements consist of atoms that combine together in chemical reactions to form compounds			
3. Understand the development and organisation of the periodic table			
4. Aware of the different properties of compounds due to the number and type of atoms and their arrangement			
5. Know that elements and compounds show characteristic chemical properties and patterns in their behaviour			

6. Understand the different reactions of metals and their compounds (carbonates, oxides) with water and acids			
7. Understand the reactions of acids and bases (neutralisation, reaction with indicators)			
8. Understand that the properties of materials determine their uses (eg. conductivity of heat/electricity, reactivity, malleability, density)			
9. Know that new materials are made from natural resources by chemical reactions (eg. limestone, metal ores, crude oil, polymers)			

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Organisms, behaviour and health			
1. Understand that life processes are supported by the organisation of cells into tissues, organs and body systems			
2. Know that the human reproductive cycle includes adolescence, fertilisation and foetal development			
3. Appreciate that conception, growth, development, behaviour and health can be affected by diet, drugs and disease			
4. Aware of the importance of healthy eating and exercise			
5. Aware of the effects of drugs such as alcohol, tobacco and marijuana on mental and physical health			

6. Know that hormones are chemical messengers that enable body systems to respond to internal changes			
7. Know that the nervous system (receptors, reflex arcs, the eye) enables the body to respond to external changes			
8. Aware of the effects of bacteria and viruses (including those associated with STDs)			
9. Understand that the ways in which organisms function are related to the genes in their cells			
10. Know that all living things show variation including inherited and environmental variation and variation through genetic engineering			
11. Appreciate that variation in species can lead to evolutionary change			

12. Understand the principles and processes associated with genetic engineering and selective breeding			
13. Know that living things can be classified and are interdependent and adapted to their environment			
14. Know that living things interact with each other and their environment			
15. Understand how behaviour in animals (including humans) is influenced by internal and external factors and can be investigated and measured			

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Environment, Earth and universe			
1. Understand that geological events are a combination of chemical and physical processes, this includes rock formation and weathering			
2. Am aware of the observed movements of the moon, stars, planets and other celestial bodies			
3. Understand how the movements and tilt of the Earth cause seasons, day and night and years			
4. Know that the solar system is part of the universe which has changed since its origin and continues to show long-term changes			

5. Show consideration of historical misconceptions about the solar system due to insufficient evidence			
6. Understand how human activity and natural processes can lead to changes in the environment; these can be assessed using living and non-living indicators			
7. Know how the surface and atmosphere of the Earth have changed since the Earth's origin and are still changing			