

Grade Descriptors for Science

Years 7 -11

Grade 9

<p>Physics</p>	<ul style="list-style-type: none"> - Students demonstrate both exceptional breadth and depth of knowledge and understanding of energy, forces and space. - Students apply this effectively in their descriptions and explanations, identifying complex links and patterns within and between topics, for example understanding how models like the particle model are useful in explaining physical phenomena, such as how sweating causes cooling. - Students independently interpret, evaluate and synthesise data from a range of sources in a diverse range of abstract contexts and apply their understanding to a wide range of data on energy efficient physical systems. - Students demonstrate a detailed understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence gathering, for example through the role of artificial satellites and probes in communications and space exploration. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts, such as alternative methods of electricity generation.
<p>Chemistry</p>	<ul style="list-style-type: none"> - Students demonstrate exceptional breadth and depth of knowledge and understanding of materials, their properties and the Earth, for example the different methods of rock formation and what we can learn from them. - Students apply this effectively in their descriptions and explanations, identifying complex links and patterns within and between topics, for example relating the properties of materials to the nature of their constituent particles. - Students independently interpret, evaluate and synthesise data from a diverse range of sources in a range of abstract contexts, and apply their understanding to a wide range of chemical systems, such as explaining chemical behaviours that do not fit expected patterns. - Students demonstrate a detailed understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence-gathering. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts.
<p>Biology</p>	<ul style="list-style-type: none"> - Students demonstrate both exceptional breadth and depth of knowledge and understanding of organisms, their behaviour and the environment. - Students apply this effectively in their descriptions and explanations, identifying complex links and patterns within and between topics, for example linking internal and external cell structures to life processes. - Students independently interpret, evaluate and synthesise data, from a diverse range of sources in a range of abstract contexts, and apply their understanding to a wide range of biological systems. - Students demonstrate a detailed understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence-gathering, for example in the study of global climate change. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts, such as addressing problems arising from global climate change.

Grade 8

Physics	<ul style="list-style-type: none"> -Students demonstrate both breadth and depth of knowledge and understanding of energy, forces and space. - Students apply this effectively in their descriptions and explanations, identifying complex links and patterns within and between topics, for example understanding how models like the particle model are useful in explaining physical phenomena, such as how sweating causes cooling. - Students interpret, evaluate and synthesise data from a range of sources in a range of contexts and apply their understanding to a wide range of data on energy efficient physical systems. - Students demonstrate an understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence gathering, for example through the role of artificial satellites and probes in communications and space exploration. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts, such as alternative methods of electricity generation.
Chemistry	<ul style="list-style-type: none"> - Students demonstrate both breadth and depth of knowledge and understanding of materials, their properties and the Earth, for the different methods of rock formation and what we can learn from them. - Students apply this effectively in their descriptions and explanations, identifying complex links and patterns within and between topics, for example relating the properties of materials to the nature of their constituent particles. - Students interpret, evaluate and synthesise data from a range of sources in a range of contexts, and apply their understanding to a wide range of chemical systems, such as explaining chemical behaviours that do not fit expected patterns. - Students demonstrate an understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence-gathering. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts.
Biology	<ul style="list-style-type: none"> - Students demonstrate both breadth and depth of knowledge and understanding of organisms, their behaviour and the environment. - Students apply this effectively in their descriptions and explanations, identifying complex links and patterns within and between topics, for example linking internal and external cell structures to life processes. - Students interpret, evaluate and synthesise data, from a range of sources in a range of contexts, and apply their understanding to a wide range of biological systems. - Students demonstrate an understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence-gathering, for example in the study of global climate change. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts, such as addressing problems arising from global climate change.

Grade 7

Physics	<ul style="list-style-type: none"> -Students demonstrate both breadth and depth of knowledge and understanding of energy, forces and space. - Students apply this effectively in their descriptions and explanations, identifying complex links and patterns within and between topics, for example understanding how models like the particle model are useful in explaining physical phenomena, such as how sweating causes cooling. - Students interpret, evaluate and synthesise data from a range of sources in a range of contexts and apply their understanding to a wide range of data on energy efficient physical systems. - Students demonstrate an understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence gathering, for example through the role of artificial satellites and probes in communications and space exploration. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts, such as alternative methods of electricity generation.
Chemistry	<ul style="list-style-type: none"> - Students demonstrate increasing breadth and depth of knowledge and understanding of materials, their properties and the Earth, for example the different methods of rock formation and what we can learn from them. - Students apply this effectively in their descriptions and explanations, identifying increasingly complex links and patterns within and between topics, for example relating the properties of materials to the nature of their constituent particles. - Students interpret, evaluate and synthesise data from a range of sources in a range of simpler contexts, and apply their understanding to a wide range of chemical systems, such as explaining chemical behaviours that do not fit expected patterns. - Students demonstrate an understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence-gathering. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts.
Biology	<ul style="list-style-type: none"> - Students demonstrate increasing breadth and depth of knowledge and understanding of organisms, their behaviour and the environment. - Students apply this effectively in their descriptions and explanations, identifying increasingly complex links and patterns within and between topics, for example linking internal and external cell structures to life processes. - Students interpret, evaluate and synthesise data, from a range of sources in a range of simpler contexts, and apply their understanding to a wide range of biological systems. - Students demonstrate an understanding of how scientific knowledge and understanding changes, building on processes such as questioning, investigating and evidence-gathering, for example in the study of global climate change. - Students describe and explain the importance of a wide range of applications and implications of science in familiar and unfamiliar contexts, such as addressing problems arising from global climate change.

Grade 6

Physics	<ul style="list-style-type: none"> -Students demonstrate extensive knowledge and understanding related to energy, forces and space, for example the passage of sound waves through a medium. - Students use and apply this effectively in their descriptions and explanations, identifying links between topics. - Students interpret, evaluate and synthesise data from a complex range of sources and in a range of contexts.
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	<ul style="list-style-type: none"> - Students show they understand the relationship between evidence and scientific ideas, and why scientific ideas may need to be changed, such as the developing understanding of the structure of the solar system. - Students describe and explain the importance of a wide range of applications and implications of science, such as relating the dissipation of energy during energy transfer to the need to conserve limited energy resources.
Chemistry	<ul style="list-style-type: none"> - Students demonstrate extensive knowledge and understanding related to materials, their properties and the Earth. - Students use and apply this effectively in their descriptions and explanations, identifying links between topics, for example relating mode of formation of rocks to their texture and mineral content. - Students represent common compounds by chemical formulae and use these formulae to form balanced symbol equations for reactions. - Students interpret, evaluate and synthesise data from a range of complex sources and in a range of contexts, such as describing chemical reactions, classifying them and suggesting how new substances could be made. - Students show they understand the relationship between evidence and scientific ideas, and why scientific ideas may need to be changed. - Students describe and explain the importance of a wide range of applications and implications of science.
Biology	<ul style="list-style-type: none"> - Students demonstrate extensive knowledge and understanding related to organisms, their behaviour and the environment. - Students use and apply this effectively in their descriptions and explanations, identifying links between topics, for example relating cellular structure of organs to their associated life processes. - Students interpret, evaluate and synthesise data from a range of complex sources and in a range of contexts, for example environmental data from fieldwork. - Students show they understand the relationship between evidence and scientific ideas, and why scientific ideas may need to be changed, for example the short-term and long-term effects of environmental change on ecosystems. - Students describe and explain the importance of a wide range of applications and implications of science, such as relating photosynthesis and respiration to changes in the atmosphere and growth of crops.

Grade 5

Physics	<ul style="list-style-type: none"> - Students demonstrate wider knowledge and understanding related to energy, forces and space, for example the passage of sound waves through air. - Students use and apply this effectively in their descriptions and explanations, identifying links between topics. - Students interpret, evaluate and synthesise data from a range of sources and in a range of contexts. - Students show they understand the relationship between evidence and scientific ideas, and why scientific ideas may need to be changed, such as the developing understanding of the structure of the solar system. - Students describe and explain the importance of a wide range of applications and implications of science, such as relating the dissipation of energy during energy transfer to the need to conserve limited energy resources.
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Chemistry	<ul style="list-style-type: none"> - Students demonstrate wider knowledge and understanding related to materials, their properties and the Earth. - Students use and apply this effectively in their descriptions and explanations, identifying links between topics, for example relating mode of formation of rocks to their texture and mineral content. - Students represent common compounds by chemical formulae and use these formulae to form balanced symbol equations for reactions. - Students interpret, evaluate and synthesise data from a range of sources and in a range of contexts, such as describing chemical reactions, classifying them and suggesting how new substances could be made. - Students show they understand the relationship between evidence and scientific ideas, and why scientific ideas may need to be changed. - Students describe and explain the importance of a wide range of applications and implications of science.
Biology	<ul style="list-style-type: none"> - Students demonstrate wider knowledge and understanding related to organisms, their behaviour and the environment. - Students use and apply this effectively in their descriptions and explanations, identifying links between topics, for example relating cellular structure of organs to their associated life processes. - Students interpret, evaluate and synthesise data from a range of sources and in a range of contexts, for example environmental data from fieldwork. - Students show they understand the relationship between evidence and scientific ideas, and why scientific ideas may need to be changed, for example the short-term and long-term effects of environmental change on ecosystems. - Students describe and explain the importance of a wide range of applications and implications of science, such as relating photosynthesis and respiration to changes in the atmosphere and growth of crops.

Grade 4

Physics	<ul style="list-style-type: none"> - Students describe a wide range of processes and phenomena related to energy, forces and space, using abstract ideas and appropriate terminology and sequencing a number of points, for example how the particles move in changes of state. - Students make links between different areas of science in their explanations, such as between electricity and magnetism. - Students apply and use more abstract knowledge and understanding in a range of contexts, such as the appearance of objects in different colours of light. - Students explain how evidence supports some accepted scientific ideas, such as the role of gravitational attraction in determining the motion of bodies in the solar system. - Students explain, using abstract ideas where appropriate, the importance of some applications and implications of science, such as the uses of electromagnets.
Chemistry	<ul style="list-style-type: none"> - Students describe a wide range of processes and phenomena related to materials, their properties and the Earth, using abstract ideas and appropriate terminology and sequencing a number of points, for example the rock cycle. - Students make links between different areas of science in their explanations, such as between the nature and behaviour of materials and their particles. - Students apply and use more abstract knowledge and understanding, in a range of contexts, such as the particle model of matter, and symbols and formulae for elements and compounds. - Students explain how evidence supports some accepted scientific ideas, such as the reactivity series of metals.

	<ul style="list-style-type: none"> - Students explain, using abstract ideas where appropriate, the importance of some applications and implications of science, such as the need to consider the availability of resources, and environmental effects, in the production of energy and materials.
Biology	<ul style="list-style-type: none"> - Students describe a wide range of processes and phenomena related to organisms, their behaviour and the environment, using abstract ideas and appropriate terminology and sequencing a number of points, for example respiration and photosynthesis, or pyramids of biomass. - Students make links between different areas of science in their explanations. - Students apply and use more abstract knowledge and understanding, in a range of contexts, such as inherited and environmental variation. - Students explain how evidence supports some accepted scientific ideas, such as the structure and function of cells. - Students explain, using abstract ideas where appropriate, the importance of some applications and implications

Grade 3

Physics	<ul style="list-style-type: none"> - Students describe processes and phenomena related to energy, forces and space, using abstract ideas and appropriate terminology, for example electric current as a way of transferring energy. - Students take account of a number of factors in their explanations of processes and phenomena, for example in the relative brightness of stars and planets. - Students also use abstract ideas or models, for example sustainable energy sources and the refraction of light. - Students apply and use knowledge and understanding in unfamiliar contexts. - Students describe some evidence for some accepted scientific ideas, such as the transfer of energy by light, sound or electricity, and the refraction and dispersion of light. - Students explain the importance of some applications and implications of science, such as the responsible use of unsustainable sources of energy.
Chemistry	<p>Students describe processes and phenomena related to materials, their properties and the Earth, using abstract ideas and appropriate terminology, for example the particle model applied to solids, liquids and gases.</p> <ul style="list-style-type: none"> - Students take account of a number of factors or use abstract ideas or models in their explanations of processes and phenomena, such as word equations. - Students apply and use knowledge and understanding in unfamiliar contexts, such as relating changes of state to energy transfers in a range of contexts such as the formation of igneous rocks. - Students describe some evidence for some accepted scientific ideas, such as the patterns in the reactions of acids with metals and the reactions of a variety of substances with oxygen. - Students explain the importance of some applications and implications of science, such as the production of new materials with specific desirable properties.
Biology	<ul style="list-style-type: none"> - Students describe processes and phenomena related to organisms, their behaviour and the environment, using abstract ideas and appropriate terminology, for example simple cell structure and function. - Students take account of a number of factors or use abstract ideas or models in their explanations of processes and phenomena, such as environmental factors affecting the distribution of organisms in habitats. - Students apply and use knowledge and understanding in unfamiliar contexts, such as a food web in a habitat. - Students describe some evidence for some accepted scientific ideas, such as the causes of variation between living things. - Students explain the importance of some applications and implications of science, such as the use of gene banks to prevent extinction.

Grade 2

Physics	<ul style="list-style-type: none"> - Students describe processes and phenomena related to energy, forces and space, drawing on abstract ideas and using appropriate terminology, for example 'balanced forces'. - Students explain processes and phenomena, in more than one step or using a model, such as the length of a day or a year. - Students apply and use knowledge and understanding in familiar contexts. - Students recognise that both evidence and creative thinking contribute to the development of scientific ideas, such as objects being seen when light from them enters the eye. - Students describe applications and implications of science, such as the ways sound can be produced and controlled, for example in musical instruments.
Chemistry	<ul style="list-style-type: none"> - Students describe processes and phenomena related to materials, their properties and the Earth, drawing on abstract ideas and using appropriate terminology, for example the weathering of rocks. - Students explain processes and phenomena, in more than one step or using a model, such as the deposition of sediments and their formation into rocks. - Students apply and use knowledge and understanding in familiar contexts, such as identifying changes of state. - Students recognise that both evidence and creative thinking contribute to the development of scientific ideas, such as basing separation methods for mixtures on physical and chemical properties. - Students describe applications and implications of science, such as the uses of metals based on their specific properties or the benefits and drawbacks of the use of fossil fuels.
Biology	<ul style="list-style-type: none"> - Students use knowledge and understanding of organisms, their behaviour and the environment, such as the basic life processes of growth and reproduction, to describe similarities, differences and changes in the plants, animals, and non-living things they observe. - Students use simple scientific ideas with evidence they have collected to give explanations of their observations, linking cause and effect, for example lack of light or water affecting plant growth and the ways in which animals or plants are suited to their environments. - Students recognise and explain the purpose of a variety of scientific and technological developments in their everyday lives, for example medicines helping people get better when they are ill.

Grade 1

Physics	<ul style="list-style-type: none"> - recognise that evidence can support or refute scientific ideas, such as sounds being heard through a variety of materials. - recognise some applications and implications of science, such as the use of electrical components to make electrical devices.
Chemistry	<ul style="list-style-type: none"> - Students use their knowledge related to materials, their properties and the Earth to identify a range of common materials and some of their properties. - Students suggest answers to questions, such as the best material for a specific job, based on their own ideas and evidence.

	- Students identify science in everyday contexts and say whether it is helpful, for example ice melting.
Biology	<ul style="list-style-type: none"> - Students use their knowledge related to organisms, their behaviour and the environment to describe plants and animals, the places they are found and the basic conditions they need in order to survive. - Students use questions based on their own ideas and evidence such as finding different types of plants and animals in different places. - Students identify science in everyday contexts and say whether it is helpful, for example ways of growing vegetables for food.

Foundation +

Physics	- recognise some processes and phenomena related to energy, forces and space, drawing on scientific knowledge and understanding and using appropriate terminology, for example the observed position of the sun in the sky over the course of a day.
Chemistry	<ul style="list-style-type: none"> - Students recognise, and describe similarities and differences between the materials they observe, using these to sort them into groups. - Students recognise and describe ways in which some materials are changed by heating or cooling or by processes such as bending or stretching.
Biology	- Students recognise and describe similarities and differences between the plants, humans and other animals students observe, using these to sort them into groups.