BMAT KS3 Level Descriptors: Science

BMAT KS3 Level 1- 8

Level	Level Descriptor
1	Students can identify scientific concepts from text and diagrams. Students can make links between Science and everyday life and recognise evidence to answer simple questions. **Biology:** ▪ Recognise and identify a range of common plants, animals, and natural events ▪ Name external parts or feature of plants ▪ Use that evidence to identify plants or animals ▪ Make links between Science and everyday objects and experiences **Chemistry:** ▪ Recognise some common materials and their sensory properties ▪ Communicate descriptions and observations ▪ Recognise evidence that has been used to answer a question, such as identifying similar materials. ▪ Make links between Science and everyday objects and experiences **Physics:** ▪ Identify some changes in light, sound, or movement ▪ Recognise that light and sound come from a variety of sources ▪ Recognise evidence that has been used to answer a question, such as how a musical instrument makes a noise. ▪ Make links between Science and everyday objects and experiences **How Science Works:** ▪ Make observations about features of objects, living things and events ▪ They communicate their findings in ways such as talking about their work in everyday terms
2	Students can use their knowledge to describe scientific concepts. Students can describe similarities and differences. They can also describe Science in everyday contexts and say whether it's helpful. **Biology:** ▪ Students can use their knowledge related to organisms, their behaviour and the environment to describe plants and animals ▪ They can describe similarities and differences between the plants, humans and other animals they observe, using these to sort them into groups ▪ They can describe Science in everyday contexts and say whether it is helpful **Chemistry:** ▪ Describe a range of common materials and their properties ▪ They can describe similarities and differences between the materials they observe, using these to sort them into groups ▪ They suggest answers to questions, such as the best material to reflect light, based on their own ideas and evidence. ▪ They can describe Science in everyday contexts and say whether it is helpful **Physics:** ▪ Students can use their knowledge related to energy, forces and space to describe a range of properties and effects of light, sound, forces, and electricity ▪ They suggest answers to questions such as which sound is loudest based on their own ideas and evidence ▪ They can describe Science in everyday contexts and say whether it is helpful **How Science Works:** ▪ Students can respond to suggestions and make their own suggestions, with help, about how to collect relevant data and answer questions ▪ They find information by using texts ▪ They follow direct instructions ▪ They make observations and measurements ▪ They record findings using prepared tables ▪ They say whether what happened was what they expected

3	Students can use knowledge and understanding to analyse the similarities and differences. They can also classify and compare. They use simple scientific ideas with evidence they have collected to give explanations of their observations, linking cause and effect. They can explain the purpose of a variety of scientific and technological developments in their everyday lives. **Biology:** ▪ Students can use knowledge and understanding of organisms, their behaviour and the environment, such as the basic life processes of growth and reproduction, to explain similarities, differences and changes in the plants, animals, and non-living things they observe ▪ They use simple scientific ideas with evidence they have collected to give explanations of their observations, linking cause and effect ▪ They can explain the purpose of a variety of scientific and technological developments in their everyday lives **Chemistry:** ▪ Students can use knowledge and understanding of materials, their properties and the Earth to sort materials into groups in a variety of ways, according to their properties ▪ They explain the ways in which some materials are suited to specific purposes such as glass for windows or copper for electrical cables ▪ They classify changes in materials as reversible, such as water freezing, and non-reversible changes ▪ They use simple scientific ideas with evidence they have collected to give explanations of their observations, linking cause and effect, for example the evaporation of water ▪ They recognise and explain the purpose of a variety of scientific and technological developments in their everyday lives, for example sustainable packaging **Physics:** ▪ Students can use their knowledge and understanding to state the cause of an observation (cause and effect) ▪ They begin to make generalisations such as sounds getting fainter the further the listener is from the source ▪ They use simple scientific ideas with evidence they have collected to give explanations of their observations, linking cause and effect, for example using a switch to turn off a light bulb in an electrical circuit ▪ They recognise and explain the purpose of a variety of scientific and technological developments in their everyday lives **How Science Works:** ▪ Students can respond to suggestions and put forward their own ideas about how to investigate an idea or find answers to questions ▪ They recognise why it is important to collect data to investigate ideas and answer questions, and use texts to find information ▪ They make relevant observations and measure quantities ▪ They carry out fair tests with some help, recognising and explaining what makes them fair. ▪ With help, they can recognise variables ▪ They record findings in a variety of ways, including tables or charts. ▪ They give explanations for observations and for patterns in measurements they have made and recorded. ▪ They communicate in a scientific way what they have found out and suggest improvements in their work.
4	Students can explain some scientific processes drawing on scientific knowledge. They can also recognize that evidence can support or refute scientific ideas. **Biology:** ▪ Students can describe some processes and phenomena related to organisms, their behaviour and the environment, drawing on scientific knowledge and understanding and using appropriate terminology ▪ They recognise that evidence can support or refute scientific ideas ▪ They recognise some applications and implications of Science **Chemistry:** ▪ Students can describe some processes and phenomena related to materials, their properties and the Earth, drawing on scientific knowledge and understanding and using appropriate terminology, for example separation methods ▪ They recognise that evidence can support or refute scientific ideas, such as the classification of reactions as reversible and irreversible

	▪ They recognise some applications and implications of Science, such as the safe use of acids and alkalis. **Physics:** ▪ Students can describe 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 ▪ They recognise that evidence can support or refute scientific ideas, such as sounds being heard through a variety of materials ▪ They recognise some applications and implications of Science, such as the use of electrical components to make electrical devices. **How Science Works:** ▪ Students can decide on an appropriate approach, including using a fair test to answer a question, and select suitable equipment ▪ They select and use methods that are adequate for the task ▪ Following instructions, they take action to control obvious risks to themselves ▪ They make a series of observations and measurements and vary one factor while keeping others the same ▪ They record their observations, comparisons and measurements using tables and bar charts and begin to plot points to form simple graphs ▪ They interpret data containing positive and negative numbers ▪ They begin to relate their conclusions to patterns in data, including graphs, and to scientific knowledge and understanding ▪ They communicate their conclusions using appropriate scientific language. They suggest improvements in their work, giving reasons.
5	Students can explain most processes and phenomena related to Science. Students can give accurate and logical analysis which includes some relevant detail and simple explanations. Students can describe applications and implications of Science. **Biology:** ▪ Students can describe processes and phenomena related to organisms, their behaviour and the environment, drawing on abstract ideas and using appropriate terminology, for example the main functions of plant and animal organs and how these functions are essential ▪ They explain processes and phenomena, in more than one step or using a model, such as the main stages of the life cycles of humans and flowering plants ▪ They apply and use knowledge and understanding in familiar contexts ▪ They recognise that both evidence and creative thinking contribute to the development of scientific ideas, such as the classification of living things ▪ They describe applications and implications of Science, such as solving some of the health problems that arise when organ damage occurs **Chemistry:** ▪ Students can 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 ▪ They explain processes and phenomena, in more than one step or using a model, such as the deposition of sediments and their formation into rocks ▪ They apply and use knowledge and understanding in familiar contexts, such as identifying changes of state ▪ They 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 ▪ They describe applications and implications of Science, such as: the uses of metals based on their specific properties and/or the benefits and drawbacks of the use of fossil fuels **Physics:** ▪ Students can describe processes and phenomena related to energy, forces and space, drawing on abstract ideas and using appropriate terminology, for example 'balanced forces' ▪ They explain processes and phenomena, in more than one step or using a model, such as the length of a day or a year ▪ They apply and use knowledge and understanding in familiar contexts ▪ They 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. ▪ They describe applications and implications of Science, such as the ways sound can be produced and controlled, for example in musical instruments

	How Science Works: ▪ Students can decide appropriate approaches to a range of tasks, including selecting sources of information and apparatus ▪ They select and use methods to obtain data systematically. They recognise hazard symbols and make, and act on, simple suggestions to control obvious risks to themselves and others ▪ They use line graphs to present data, interpret numerical data and draw conclusions from them ▪ They analyse findings to draw scientific conclusions that are consistent with the evidence ▪ They communicate these using scientific and mathematical conventions and terminology. ▪ They evaluate their working methods to make practical suggestions for improvements
6	Students can develop accurate, logical and detailed descriptions and straightforward explanations. Students can explain the importance of some applications and implications of Science. **Biology:** ▪ Students can 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 ▪ They take account of several 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 ▪ They apply and use knowledge and understanding in unfamiliar contexts, such as a food web in a habitat ▪ They describe some evidence for some accepted scientific ideas, such as the causes of variation between living things ▪ They explain the importance of some applications and implications of Science, such as the use of selective breeding **Chemistry:** ▪ Students can 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. ▪ They take account of several factors or use abstract ideas or models in their explanations of processes and phenomena, such as word equations ▪ They 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 ▪ They 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 ▪ They explain the importance of some applications and implications of Science, such as the production of new materials with specific desirable properties **Physics:** ▪ Students can 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 ▪ They take account of several factors in their explanations of processes and phenomena, for example in the relative brightness of stars and planets ▪ They also use abstract ideas or models, for example sustainable energy sources and the refraction of light ▪ They apply and use knowledge and understanding in unfamiliar contexts. They 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 ▪ They explain the importance of some applications and implications of Science, such as the responsible use of unsustainable sources of energy **How Science Works:** ▪ Students can identify an appropriate approach in investigatory work, selecting and using sources of information, scientific knowledge and understanding ▪ They select and use methods to collect adequate data for the task, measuring with precision, using instruments with fine scale divisions, and identify the need to repeat measurements and observations ▪ They recognise a range of familiar risks and take action to control them. They record data and features effectively, choosing scales for graphs and diagrams ▪ They analyse findings to draw conclusions that are consistent with the evidence and use scientific knowledge and understanding to explain them and account for any inconsistencies in the evidence ▪ They manipulate numerical data to make valid comparisons and draw valid conclusions ▪ They communicate qualitative and quantitative data effectively, using scientific conventions and terminology

	▪ They evaluate evidence, making reasoned suggestions about how their working methods could be improved
7	Students can describe a wide range of processes and phenomena using abstract ideas and accurate scientific terminology. Students can investigate different areas of Science in their explanations. Students can explain how evidence supports accepted scientific ideas. **Biology:** ▪ Students can describe a wide range of processes and phenomena related to organisms, their behaviour, and the environment- using abstract ideas, appropriate terminology, and the sequencing of a number of points, for example respiration and photosynthesis, or pyramids of biomass ▪ They make links between different areas of Science in their explanations ▪ They apply and use more abstract knowledge and understanding, in a range of contexts, such as inherited and environmental variation ▪ They explain how evidence supports some accepted scientific ideas, such as the structure and function of cells ▪ They explain, using abstract ideas where appropriate, the importance of some applications and implications of Science, such as the uses of cells in stem cell research **Chemistry:** ▪ Students can describe a wide range of processes and phenomena related to organisms, their behaviour, and the environment- using abstract ideas, appropriate terminology, and the sequencing of a number of points, for example the rock cycle ▪ They make links between different areas of Science in their explanations, such as between the nature and behaviour of materials and their particles ▪ They 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. ▪ They explain how evidence supports some accepted scientific ideas, such as the reactivity series of metals ▪ They 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. **Physics:** ▪ Students can describe a wide range of processes and phenomena related to organisms, their behaviour, and the environment- using abstract ideas, appropriate terminology, and the sequencing of a number of points, for example how energy is transferred by radiation or by conduction ▪ They make links between different areas of Science in their explanations, such as between electricity and magnetism ▪ They apply and use more abstract knowledge and understanding in a range of contexts, such as the appearance of objects in different colours of light ▪ They 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 ▪ They explain, using abstract ideas where appropriate, the importance of some applications and implications of Science, such as the uses of electromagnets **How Science Works:** ▪ Students can plan appropriate approaches and procedures, by synthesising information from a range of sources and identifying key factors in complex contexts and in which variables cannot readily be controlled ▪ They select and use methods to obtain reliable data, including making systematic observations and measurements with precision, using a range of apparatus ▪ They recognise the need for a risk assessment and consult appropriate sources of information, which they follow ▪ They record data in graphs, using lines of best fit. They analyse findings to draw conclusions that are consistent with the evidence and use scientific knowledge and understanding to explain these conclusions and identify possible limitations in primary and secondary data ▪ They use quantitative relationships between variables. They communicate effectively, using a wide range of scientific and technical conventions and terminology, including symbols and flow diagrams ▪ They begin to consider whether the data they have collected are sufficient for the conclusions they have drawn.
8	Students can demonstrate relevant and comprehensive knowledge and understanding which they use and apply effectively in their descriptions and explanations. Students can interpret, evaluate and synthesise data from a

range of sources. Students can understand the relationship between evidence and scientific ideas and why these ideas may need to be changed.

Biology:

- Students can demonstrate extensive knowledge and understanding related to organisms, their behaviour and the environment
- They 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
- They interpret, evaluate and synthesise data from a range of sources and in a range of contexts, for example environmental data from fieldwork
- 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
- They 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

Chemistry:

- Students can demonstrate extensive knowledge and understanding related to materials, their properties and the Earth
- They 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
- They represent common compounds by chemical formulae and use these formulae to form balanced symbol equations for reactions
- They 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
- They show they understand the relationship between evidence and scientific ideas, and why scientific ideas may need to be changed
- They describe and explain the importance of a wide range of applications and implications of Science

Physics:

- Students can demonstrate extensive knowledge and understanding related to energy, forces and space, for example the passage of sound waves through a medium
- They use and apply this effectively in their descriptions and explanations, identifying links between topics
- They interpret, evaluate and synthesise data from a range of sources and in a range of contexts
- They 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
- They 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

How Science Works:

- Students can recognise that different strategies are required to investigate different kinds of scientific questions, and use scientific knowledge and understanding to select an appropriate strategy
- In consultation with their teacher they adapt their approach to practical work to control risk
- They record data that are relevant and sufficiently detailed, and choose methods that will obtain these data with the precision and reliability needed
- They analyse data and begin to explain, and allow for, anomalies
- They carry out multi-step calculations and use compound measures, such as speed, appropriately
- They communicate findings and arguments, showing awareness of a range of views
- They evaluate evidence critically and suggest how inadequacies can be remedied