Inters Science

	Subject Knowledge	Working Scientifically	Mathematical skills in Science
1	A level 1 describes a student who is working towards attaining the standard usually expected for a student of that age. In relation to the curriculum at Wychwood this would be indicated by: • I can use simple circuit symbols • I can differentiate between stars, moons and planets • I can describe the motion of the planets in our solar system and their moons • I can describe some features of planets from our solar system. • I can give examples of forces • I can describe differences and similarities between object and reflection in a mirror • I can suggest ways to change the pitch of a note on a stringed instrument or wind instrument • I can use chemical symbol notation for elements correctly • I can identify and exemplify acids and alkalis and describe their dangers • I can state what ceramics, composites and polymers are and give examples of them. • I can recognise the familial nature of groups in the periodic table • I can identify trends and patterns down groups and along periods in the periodic table • I can recognise that energy is given out or taken in in chemical reactions • I can describe what a catalyst is • I can differentiate between chemical reactions and physical changes • I can identify combustion and thermal decomposition reactions • I can describe the make up of the atmosphere • I can describe ways in which carbon is recycled • I can recognise finite and renewable resources and describe the benefits of recycling • I can state what a microbe is and explain why they are harmful • I can identify situations in which microbes can be harmful. • I can list precautions humans can take to protect themselves from microbes • I can give examples of the usefulness of microbes • I can give examples of diseases spread by microbes	• Selects appropriate equipment to perform experiments. • I can draw valid simple conclusions • I can make accurate qualitative observations • I can present observational data in a suitable table • I can identify simple patterns and trends in data • I can identify hazards in experiments and suggest simple safety precautions. • I can plan and conduct experiments to test predictions. • I can make predictions using scientific language • I can plan to gather an appropriate range and number of data points • I can use a Bunsen Burner safely	• I can present data using bar graphs and line graphs. • I can use units • I can record a method as a series of logical stepwise • instructions. • I can use SI units • I can perform simple calculations • I can make simple quantitative measurements using analogue and digital devices • I can correctly use appropriate technical vocabulary associated with the topics I am studying • I can interpret simple graphs such as distance-time graphs
3	A level 3 describes a student whose attainment level is what would usually be expected for a student of that age. In relation to the curriculum at Wychwood this would be indicated by : • I can interpret chemical formulae correctly • I can generate word equations to describe chemical reactions. • I can make links between the structure of materials to their properties	• I can write reasoned explanations of the conclusion based on the experimental data. • I can accurately make and record observations and measurements.	• I can use simple equations to calculate quantities • I can present data using appropriate graphical representation and choose a suitable scale.

	• I can describe the properties of metals and non metals and the oxidation of them. • I can predict the products of metal displacement reactions using the reactivity series • I can describe properties of acids and alkalis • I can use and choose appropriate indicators • I can predict the products of neutralisation reactions and write word equations to describe the process • I can describe properties of ceramics, composites and polymers and link the uses of composites to the properties of their constituent substances • I can use data showing a pattern in physical properties in a group in the periodic table to make a prediction for a missing value. • I can distinguish between exothermic and endothermic reactions experimentally • I can describe what a catalyst is and how it works • I can use particle diagrams to describe what happens in a chemical reaction • I can describe combustion and thermal decomposition reactions • I can describe how human activities affect the make up of the atmosphere • I can construct a carbon cycle and describe methods of reducing carbon emissions • I can describe how the Earth's resources can be turned into useful materials • I can describe factors to take into account when deciding whether to extract a metal from its ore. • I can describe and justify a method of extraction for a metal based on its position in the metal reactivity series • I can differentiate between luminous and non luminous bodies in space and describe eclipses • I can describe the motion of the bodies in the solar system and the consequences of this. • I can describe qualitatively the effects of gravitational forces in the solar system • I can describe uses of satellites and the importance of geostationary orbits for some satellites • I can describe qualitatively the link between launch velocity and orbital trajectory • I can describe the use and application of diodes and LDRs • I can describe the action, use and application of electromagnets and relays • I can differentiate between force and pressure and describe the relationship between them. • I can describe longitudinal and transverse waves and sound transmission • I can link amplitude and frequency to loudness and pitch in sound waves • I can explain what an echo is • I can compare the speed of sound and light and apply this to phenomena • I can describe the law of reflection • I can describe refraction and its applications	• Identify variables (independent, dependent and control variables) in an investigation • Explain appropriate safety precautions • I can make predictions based on scientific knowledge, understanding and reasoning • I can suggest improvements to investigative approaches • I can identify anomalous data points	• Correctly and consistently use appropriate units • I can correctly use appropriate technical vocabulary associated with the topics I am studying

	• I can explain how corrective lenses work • I can explain how we see coloured objects • I can describe microbes, their action, effect on the body and application • I can describe and explain what happens during respiration • I can describe antibiotic action and discuss the consequences of antibiotic resistant bacteria • I can describe how diseases are spread and the mechanisms for preventing this • I can describe the role of tears, blood clotting, mucus membranes, stomach acid. • I can describe the nature of asepsis, disinfectants, detergents and antiseptics and their use • I can describe the role of phagocytes in engulfing pathogens and the role of lymphocytes in antibody production • I can describe and explain methods of food preservation • I can discuss The importance of macro parasitic organisms in causing illness • I can describe the application of microbes to biotechnology • Describe how microbes are used in sewage disposal		
5	A level 5 describes a student whose attainment level is well above what would usually be expected for a student of that age. In relation to the curriculum at Wychwood this may be indicated by, but not limited to the following examples: • I can represent chemical reactions using balanced symbol equations. • I can describe in detail how properties of materials are determined by their structure. • I can describe acidic nature with reference to hydrogen ions. • I can predict the position of an element in the periodic table given its properties • I can identify anomalous behaviour on the periodic table through examination of data. • I can discuss chemical reactions in terms of atoms and electrons • I can describe exothermic and endothermic reactions in terms of bond breaking and bond making processes • I can discuss catalysis in terms of energy level profiles • I can explain how changes in the make up of the atmosphere, though small, can have widespread consequences • I can critically evaluate the impact of methods used to reduce carbon emissions	• I can evaluate the reliability of methods in detail. • I can suggest further questions that may arise from results of investigations and data analysis and evaluation. • I can evaluate data, with reference to potential sources of random and systematic error • I can suggest detailed improvements to methods where reliability may be a concern. • I can use secondary sources to support my claims. • I can make predictions using scientific knowledge and understanding. • I can explain the importance of sampling techniques and control variables	• Use multiple equations to perform multi step calculations to solve problems. • I can present scientific ideas and concepts in an audience appropriate manner.

	• I can discuss how changes in behaviour and the use of alternative materials may limit the consumption of the Earth's resources. • I can describe the extraction of metals in terms of chemical reactions • I can suggest ways in which waste products from industrial processes can be reduced. • I can explain why the speed of a planet changes as it moves around its orbit • I can compare the geocetric and heliocentric models of the solar system and evaluate their relative impact. • I can use equations of motion • I can describe quantitatively how voltage and current change around complex circuits. • I can perform hydraulic system calculations • I can perform echo location calculations • I can explain phenomena using the idea of refractive index and perform calculations using it. • I can explain how scientists are able to work safely with very deadly bacteria • I can describe and explain how radiation, smoking and pickling can be used to preserve food. • I can discuss the difficulties a parasite experiences living inside a host • I can discuss the importance of biology in eliminating the spread of typhoid and cholera.	• I can describe how to improve accuracy, precision, repeatability, reproducibility and objectivity	