The Wilnecote School: Our Curriculum

The Wilnecote School
ENSURING EXCELLENCE

Year group:	Topics covered:
Year 7	There are 9 topics delivered in Y7: The topics have been mapped against the Best Evidence Science Teaching structure to ensure the best possible sequencing of knowledge
	Biology 1
Knowledge	Lesson 1 Cell Structure: • BEST- Living Dead and Never Alive • cells as the fundamental unit of living organisms • the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts • the similarities and differences between plant and animal cells Lesson 2- Specialised Cells • cells as the fundamental unit of living organisms • the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts • the similarities and differences between plant and animal cells • the structural adaptations of some unicellular organisms Lesson 3- Diffusion • the role of diffusion in the movement of materials in and between cells Lesson 4- Working together- cells, tissues and organ systems • the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms Lesson 5- Assessment Lesson 6- Feedback Lesson 7-Supplying Cells- Circulatory System • Function of blood and heart Lesson 8-Supplying Cells- Digestive System • the tissues and organs of the human digestive system, including adaptations to function • the importance of bacteria in the human digestive system Lesson 9- Supplying Cells- Enzymes • how the digestive system digests food (enzymes simply as biological catalysts)
Skills	Extended Investigation: Diffusion
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book

Biology 2	
Knowledge	Lesson 1- Heredity and Genetic Information • Inheritance, chromosomes, DNA and genes • heredity as the process by which genetic information is transmitted from one generation to the next Lesson 2- The structure and function of the genome • a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model Lesson 3- Differences within species • the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation Lesson 4- Differences within species- Graphs • the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation Lesson 5-Evolution • the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection • changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction Lesson 6- Fossils • the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection • changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction Lesson 7- Identifying and classifying • differences between species Lesson 8- Assessment Lesson 9- Feedback Lesson 10- CREST Award Discovery- Stop the Spread Lesson 11- CREST Award Discovery- Stop the Spread Lesson 12- CREST Award Discovery- Stop the Spread Lesson 13- CREST Award Discovery- Stop the Spread Lesson 14- CREST Award Discovery- Stop the Spread
Skills	Extended Investigation: Discovery CREST Award
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book
Biology 3	

<table>
<tr><td>Knowledge</td><td>
<u>Lesson 1- Good and Ill health/ Disease</u>
Making good health choices
<u>Lesson 2- Recreational Drugs- Alcohol</u>
the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.
<u>Lesson 3- Recreational Drugs- Illegal Drugs</u>
the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.
<u>Lesson 4- Healthy Diet</u>
content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed
<u>Lesson 5- Poor Diets</u>
calculations of energy requirements in a healthy daily diet
the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases
comparing energy values of different foods (from labels) (kJ)
<u>Lesson 6- Extended Practical- Energy in Foods</u>
comparing energy values of different foods (from labels) (kJ)
<u>Lesson 7- Extended Practical- Energy in Foods</u>
<u>Lesson 8- Extended Practical- Energy in Foods</u>
<u>Lesson 9- Assessment</u>
<u>Lesson 10- Feedback</u>
</td></tr>
<tr><td>Skills</td><td>Extended Investigation: Energy in Foods</td></tr>
<tr><td>Assessment</td><td>Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge
Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book</td></tr>
<tr><td colspan="2" align="center">Chemistry 1</td></tr>
<tr><td>Knowledge</td><td>
<u>Lesson 1- Composite Materials/ Classifying Materials</u>
Composite Materials- refer to BEST
the properties of metals and non-metals
<u>Lesson 2- Substance</u>
a simple (Dalton) atomic model
the concept of a pure substance
the identification of pure substances.
<u>Lesson 3-Particle Model for Solid, Liquid and Gas States</u>
the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure
<u>Lesson 4- Changes of State</u>
changes of state in terms of the particle model.
energy changes on changes of state (qualitative)
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<tr><td></td><td><u>Lesson 5- Diffusion</u>
diffusion in terms of the particle model
diffusion in liquids and gases driven by differences in concentration
<u>Lesson 6- Assessment</u>
<u>Lesson 7- Feedback</u>
<u>Lesson 8- Solutions</u>
mixtures, including dissolving
<u>Lesson 9- - Particles in Solution</u>
mixtures, including dissolving
<u>Lesson 10- Separating Solutions</u>
simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography
<u>Lesson 11- Separating Solutions</u>
simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography
<u>Lesson 12- Comparing Solubility</u>
<u>Lesson 13- Assessment</u>
<u>Lesson 14- Feedback</u></td></tr>
<tr><td>Skills</td><td>A number of practical tasks develop disciplinary knowledge.</td></tr>
<tr><td>Assessment</td><td>Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge
Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation logbook.</td></tr>
<tr><td colspan="2">Chemistry 2</td></tr>
<tr><td>Knowledge</td><td><u>Lesson 1- Atoms and Molecules</u>
differences between atoms, elements and compounds
<u>Lesson 2- Symbols and Formulae</u>
chemical symbols and formulae for elements and compounds
<u>Lesson 3- Polymer Properties</u>
properties of ceramics, polymers and composites (qualitative).
<u>Lesson 4- Formation of New Substances</u>
The difference between chemical and physical changes
<u>Lesson 5- Rearrangement of atoms</u>
chemical reactions as the rearrangement of atoms
representing chemical reactions using formulae and using equations
<u>Lesson 6- Representing Reactions</u>
representing chemical reactions using formulae and using equations
<u>Lesson 7-Conservation of Mass</u>
conservation of mass changes of state and chemical reactions.
<u>Lesson 8- Assessment</u>
<u>Lesson 9- Feedback</u></td></tr>
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	Lesson 10- Extended Practical Lesson 11- Extended Practical Lesson 12- Extended Practical
Skills	Extended Investigation: Effect of concentration on the rate of reaction.
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book
Chemistry 3	
Knowledge	Lesson 1- What is a Rock/ Structure of earth • the composition of the Earth • the structure of the Earth Lesson 2- Igneous Rocks • the rock cycle and the formation of igneous, sedimentary and metamorphic rocks Lesson 3- Physical Weathering and Erosion • the rock cycle and the formation of igneous, sedimentary and metamorphic rocks Lesson 4- Sedimentary Rocks • the rock cycle and the formation of igneous, sedimentary and metamorphic rocks Lesson 5- Metamorphic Rock • the rock cycle and the formation of igneous, sedimentary and metamorphic rocks Lesson 6-Extended Practical Lesson 7- Extended Practical Lesson 8- Extended Practical Lesson 9- Rock Cycle • the rock cycle and the formation of igneous, sedimentary and metamorphic rocks Lesson 10- Fossil Fuels • Recommended by BEST can be cut if necessary Lesson 11- Assessment Lesson 12- Feedback
Skills	Extended Investigation: Effect of viscosity on rate of flow.
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation logbook
Physics 1	
Knowledge	Lesson 1- What forces do/ Describing Forces • forces as pushes or pulls, arising from the interaction between two objects • forces measured in newtons, measurements of stretch or compression as force is changed Lesson 2- Balanced and Unbalanced Forces • using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces Lesson 3- Friction Extended Practical

	• forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water (Focus on friction drag and air resistance will be covered later on) Lesson 4- Friction Extended Practical • forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water (Focus on friction drag and air resistance will be covered later on) Lesson 5- Friction Extended Practical • forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water (Focus on friction drag and air resistance will be covered later on) Lesson 6- Energy Stores • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change • comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions • using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes. • other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. Lesson 7- Energy Transfers • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change • comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions • using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes. • other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. Lesson 8- Energy Transfers • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change • comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions • using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes. • other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. Lesson 9- Assessment Lesson 10- Feedback
Skills	Extended Investigation: The effect of surface and load on frictional forces.
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation logbook.

<table>
<tr><th colspan="2">Physics 2</th></tr>
<tr><td>Knowledge</td><td><u>Lesson 1- Production and Transmission of Sound</u>
frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound
sound needs a medium to travel, the speed of sound in air, in water, in solids
<u>Lesson 2- Hearing and Hearing Ranges-Extended Practical</u>
sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal
auditory range of humans and animals.
<u>Lesson 3- Extended Practical</u>
<u>Lesson 4- Extended Practical</u>
<u>Lesson 5- Using Sound</u>
pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound; waves transferring information for conversion to electrical signals by microphone.
<u>Lesson 6- Assessment</u>
<u>Lesson 7- Feedback</u>
<u>Lesson 8- Characteristics of Light</u>
the similarities and differences between light waves and waves in matter
light waves travelling through a vacuum; speed of light
<u>Lesson 9- Eye and Pinhole Camera</u>
use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye
light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras
<u>Lesson 10- Seeing in Colour</u>
colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.
<u>Lesson 11- Assessment</u>
<u>Lesson 12-Feedback</u></td></tr>
<tr><td>Skills</td><td>Extended Investigation: How light intensity affect the output of solar cells.</td></tr>
<tr><td>Assessment</td><td>Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge
Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book</td></tr>
<tr><th colspan="2">Physics 3</th></tr>
<tr><td>Knowledge</td><td><u>Lesson 1- Making Circuits</u>
Symbols etc and build circuits
<u>Lesson 2- Current</u>
electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge</td></tr>
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	<u>Lesson 3-Voltage</u> • potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current <u>Lesson 4- Static Electricity</u> • separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects • the idea of electric field, forces acting across the space between objects not in contact. <u>Lesson 5- Resistance</u> • potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current • differences in resistance between conducting and insulating components (quantitative). <u>Lesson 6- Assessment</u> <u>Lesson 7- Feedback</u> <u>Lesson 8- Magnetic Fields</u> • magnetic poles, attraction and repulsion • magnetic fields by plotting with compass, representation by field lines <u>Lesson 9- Earth’s Magnetic Field</u> • Earth’s magnetism, compass and navigation <u>Lesson 10- Electromagnets</u> • the magnetic effect of a current, electromagnets, D.C. motors (principles only). <u>Lesson 11- Electricity Bills</u> • Calculation of fuel uses and costs in the domestic context • comparing power ratings of appliances in watts (W, kW) • comparing amounts of energy transferred (J, kJ, kW hour) • domestic fuel bills, fuel use and costs • fuels and energy resources. <u>Lesson 12- Assessment</u> <u>Lesson 13- Feedback</u>
Skills	A range of practical tasks develop disciplinary knowledge.
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation logbook
Year 8	The six topics delivered in Y8 are: Astronaut School; At Home; Living in the Arctic; The Zoo; Going on Holiday; The Alchemist. The topics are again sequenced based on the BEST structure. Astronaut School, At Home and Living in the Arctic are delivered in the first half of the year. The Zoo, Going on Holiday and The Alchemist are delivered in the second half
Astronaut School	
Knowledge	G10 I can explain how ventilation occurs with reference to pressure changes and measuring lung volume.

	E15/E19 I can describe and explain how thermal energy is transferred by convection in terms of particles. E16/E18 I can describe and explain how thermal energy is transferred by radiation, in terms of particles. E13/E20 I can describe and explain the expansion of heated materials. E23 I can suggest why thermal insulators reduce thermal energy transfer. SP6/SP7/ SP9 I can state that gravitational force is a non-contact force that affects objects within a gravitational field. I can state that all objects have a gravitational field. SP101 I can describe what happens to gravity as two things get further apart. SP102 Describe the relationship between weight, gravitational field strength and mass. SP103 I can describe the difference between mass and weight. SP21/SP26 I can explain that the movement of light is measured in light years, and that this is how far light travels in one year. I can describe that this is a measurement. MA11 I can explain the following physical changes in terms of conservation of material, mass and reversibility: melting, freezing, sublimation, condensation. MA3/MA4/MA8 I can describe ways in which energy is stored, including describing chemical, gravitational and elastic as forms of potential energy. MA14 I can interpret block and Sankey diagrams.
Skills	Extended Investigation: Heat transfer - Investigate the effect of different levels of insulation on the cooling of water.
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book
At Home	
Knowledge	PI4/PI8 I can describe pure substances and mixtures, including dissolved substances. PI6 I can describe how impurities may affect boiling and melting points of impure substances EA22 I can discuss the efficacy of recycling D1/D4 I can list the contents of a healthy diet and describe why each part is needed. D6 I can explain the consequences of imbalances in the diet (obesity, starvation and deficiency related diseases) D2/D3 I can name and describe the functions of some tissues and organs in the digestive system-3 (from year 7 hospitals) D11 I can make calculations of energy requirements in a healthy diet. D9 I can link adaptations of different parts of the digestive system to their functions. D5 I can outline the process of digesting food. D7 I can explain how digestion happens, with reference to enzymes. EC5/EC7 I can describe how power ratings relate to energy transfer and explain the effect of a higher power rating on the cost of running an appliance. EC14 I can calculate cost of electricity in domestic fuel bills when given energy transferred and cost per unit. EC11 I can compare and contrast energy resources. EC15/EC16 I can use scientific principles to suggest and justify which energy resources may be most suitable.

Skills	Extended Investigation: Boiling points - investigate how salts can affect the boiling point if water
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book
Living in the Arctic	
Knowledge	C11 I can describe the process of diffusion. C15 I can suggest how the rate of diffusion may be affected. PI7/PI13 I can describe what diffusion is and explain how diffusion happens in terms of the particle model. PI16 I can suggest how the rate of diffusion may be affected G8/G9 I can explain how structures in the human gas exchange system are adapted 0to their functions. EA19 I can suggest ways that the level of carbon dioxide in the atmosphere can be reduced. LW17 I can describe refraction using a ray model diagram. LW18 I can describe the formation of an image from specular reflection in a plane mirror using a ray model diagram. LW21 I can describe how light behaves in relation to different materials using the words transparent, translucent and opaque.
Skills	Extended Investigation: Diffusion - investigate the factors affecting the rate of diffusion
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book
The Zoo	
Knowledge	I9 I can explain that variation can be continuous or discontinuous, including the use of data. CR6 I can summarise the reactants and products of aerobic and anaerobic respiration using word equations CR7 I can compare and contrast aerobic and anaerobic respiration. CR8 I can evaluate the implications of aerobic and anaerobic respiration for organisms based on the reactants and products. E5 I can explain changes of state with reference to the energy levels of particles and whether a chemical reaction is exothermic or endothermic. E6 I can explain that during chemical reactions, energy may be absorbed or released during the making and breaking of bonds. M4 I C can describe simple displacement reactions when given the order of metals and carbon in the reactivity series. SW15/SW16 I can describe how sound requires matter to travel, and I can explain which material sound will travel fastest through with reference to particle arrangement. SW18 I can explain what it means to describe sound as a longitudinal wave, with reference to the direction of vibrations and energy. MG16/MG17 I can describe how to make an electromagnet and increase the strength of an electromagnet.
Skills	Extended Investigation: The Reactivity Series - investigate the relative reactivity of metals
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book
Going on Holiday	
Knowledge	H3 I can explain some effects of recreational drugs and substance misuse on behaviour, health and life processes. H4 I can evaluate some effects of recreational drugs on behaviour, health and life processes. RE8 I can discuss the importance of insect pollination and plant reproduction, with reference to human food security.

	R9 I can investigate methods of dispersal mechanisms quantitatively. CH14 I can explain the conditions and uses of neutralisation, combustion, thermal decomposition, oxidation, displacement and the reactions of metals and acids. PF7 I can describe how floating or sinking is dependent on density. SP19 I can describe how the seasons are due to the orbit of the Earth around the Sun and the fact the Earth is tilted on its axis. SP27 I can explain how the different seasons occur in the northern hemisphere, with reference to the tilt of the Earth and proximity to the Sun. SP29 I can apply knowledge of the seasons in the northern hemisphere to explain why the southern hemisphere experiences seasons differently.
Skills	Extended Investigation: Seed dispersal – investigate the factors affecting seed dispersal
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book
The Alchemist	
Knowledge	CH11 I can represent chemical reactions using word equations. CE23 I can describe how electrical current splits up at a branch in a parallel circuit and adds together when the branches join. CE25 I can describe how in a parallel circuit the potential difference is the same for each branch as the battery or cell. SE7 I can discuss some examples and applications of static electricity. SE8 I can explain how electrostatic force may attract a non-charged object through the induction of charge. SE2/ SE3/ SE4 I can describe the force between two charged objects as electrostatic force, and that this is either repulsion or attraction. I can describe electrostatic force as a non-contact force where objects are affected if they are inside the electric SE6 I can describe how the movement of electrons can result in objects becoming charged with static electricity.
Skills	Extended Investigation: Rates of Reaction – investigate the effect of concentration on metal acid reactions
Assessment	Knowledge assessed in formative tests and RAG rates against Doddle Steps. Assessment followed by ACTS lesson to secure knowledge Skills assessment marked against specified criteria for the investigation indicated on the front of the investigation log book
Year 9	Y9 is a transition year between KS3 and KS4. Where KS3 content is duplicated in the GCSE specification it is used to develop the modes of learning needed in order to succeed at KS4, while ensuring complete coverage of the National Curriculum. The topics covered are: Physics – Energy; Electricity; Particles Biology – Cell Biology; Organisation and Systems Chemistry – The Periodic Table; Atomic Structure; Bonding; Properties of Matter Skills are further developed by introducing the required practicals for each topic which are integrated into the SoW and delivered at the appropriate point when the relevant knowledge has been covered. This is supported by a range of other practical activities as content allows

Assessment	Each topic is punctuated by a series of short low tariff tests based on past paper questions. This assesses knowledge but also allows students to practice the skills required in answering exam questions. Each Assessment is followed by an ACTS lesson where students complete a self-assessment and then complete a series of bespoke tasks in order to fill gaps in learning and secure knowledge. At the end of each topic a final assessment assesses all the work covered in the topic. The assessments used are those produced by AQA on the Exampro platform. The assessments are marked using the mark schemes provided by AQA in order to ensure standardisation of marking and to give as accurate a picture as possible of student progress. Additionally, “Going Green” weeks are interleaved into the program of study. These weeks reflect back on topics previously covered in order to ensure better knowledge retention across the course.