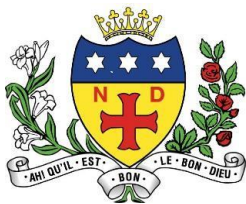


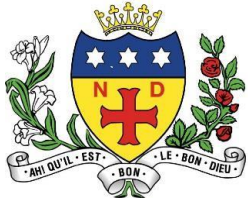
Biology Curriculum Plan

Intent:

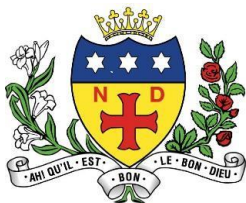
Year	What will students learn?	Rationale	How will students be assessed?	Real world (disciplinary knowledge / careers / local area)
7	<ol style="list-style-type: none"> 1. Cells <ol style="list-style-type: none"> a. animal, plant and specialised cells b. levels of organisation c. diffusion 2. Reproduction <ol style="list-style-type: none"> a. Plant reproduction b. Male & female reproduction systems c. Fertilisation, implantation & development of the foetus d. Menstrual cycle 3. Systems in the human body <ol style="list-style-type: none"> a. Digestive system: Digestion, 	<p>Our key stage 3 scheme of work is based on the national curriculum for key stage 3. The aim is to provide the breath and depth required to transition students from different experiences at primary schools and to foster their enthusiasm and enjoyment for the subject. We aim to have a 'hands on' practical approach to Science.</p> <p>Cells are the building blocks of life. Teaching cells first enables students to have basic information on the variety of cells within the body and how cells function together to form tissues, organs and organ systems which are the later topics.</p> <p>The knowledge of cells allows reproduction to be taught on a cellular level with fertilisation of specialised cells (egg and sperm) and leading to the development of the foetus.</p> <p>The way cells form organs then organ systems, allows students to piece together prior knowledge and understand 'how the</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p> <p>Summative assessment is one test for every two topics:</p> <ul style="list-style-type: none"> • Cells & reproduction (autumn/spring term dependent upon order of class teaching) • Systems of the body & healthy lifestyles (spring/summer dependent upon order of class teaching) 	<p>Develop general practical skills including use of general laboratory equipment (e.g. glassware) and a specific focus on how to measure volumes precisely using measuring cylinders of correct size and or/pipettes.to measure set volume.</p> <p>Develop specific skills on how to use a microscope, varying the magnification and learning how to focus cells on microscope slides. Learning how to prepare microscope slides using thin specimens so light passes through and using mounted needles to minimise air bubbles.</p>



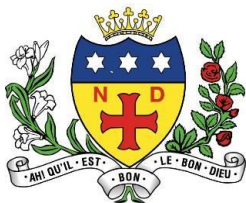
	<p>enzymes & food tests</p> <p>b. Respiratory system: Gas exchange & breathing</p> <p>c. Circulatory system: Heart structure & function</p> <p>d. Skeletal system: Movement & joints</p> <p>4. Healthy lifestyles</p> <p>a. Balanced diet</p> <p>b. Smoking & alcohol</p>	<p>body works' in greater detail. This includes how the stomach and pancreas help breakdown the food we eat, how the lungs aid breathing, how the heart pumps blood, how the muscles allow movement.</p> <p>The knowledge and understanding of these systems allow students to gain an understanding of the influence of what lifestyle choices can be made about the food they eat, exercise they do and how these can have a negative and positive impact of their lifestyle.</p> <p>Within the scheme of work, practical activities are built in to support theory and develop students' problem solving and analytical skills.</p>		
8	<p>1. Staying alive</p> <p>a. Aerobic respiration</p> <p>b. Anaerobic respiration</p> <p>c. Immune system</p> <p>2. Variation</p> <p>a. Types of variation</p> <p>b. Structure of DNA & genes</p> <p>c. Natural selection</p>	<p>Year 8 course continues from year 7 with new content being taught to enabling us to cover topic areas giving a basic understanding required before moving onto GCSEs.</p> <p>Respiration is covered in year 8 along with photosynthesis giving students a biochemical overview of these reactions. These are taught in year 8 as the concepts are complicated and needs to build on fundamental principles of cells and systems covered in year 7.</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p> <p>Summative assessment is one test for every two topics:</p> <ul style="list-style-type: none"> Staying alive & variation 	<p>Continue to develop general practical skills including use of general laboratory equipment (e.g. glassware).</p> <p>Formulate hypothesis / predictions before carrying out a practical to test if they were correct.</p>



	<ul style="list-style-type: none"> d. Selective breeding e. Genetic engineering <p>3. Photosynthesis</p> <ul style="list-style-type: none"> a. Classification of plants b. Photosynthesis reaction c. Transpiration d. Maximising plant growth <p>4. Relationships in ecosystems</p> <ul style="list-style-type: none"> a. Sampling b. Food chains, webs, pyramids c. Bioaccumulation d. Competition 	<p>Variation introduces the idea of DNA and its importance and the final ecosystems topic allows students to gain an overview of the environmental impact on organisms.</p>	<ul style="list-style-type: none"> • Photosynthesis & relationships in ecosystems 	<p>Skills to plot a graph are further developed and guidance is given to focus on different aspects of graph drawing e.g. focus on joining points as a line of best fit not just dot-to-dot.</p> <p>Risk assessments considered looking at what safety precautions need to be taken for practicals in general (e.g. goggles) and specific safety precautions (e.g. using bacteria).</p> <p>Microbiology using agar plates – learning how grow bacteria safely and use aseptic techniques.</p> <p>Using lamps to vary light intensity in photosynthesis. Graph skills again developed, with particular focus on independent and dependent variables and which is placed on the x</p>
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				<p>and y axis along with calculation and plotting of mean values.</p> <p>Learning how to use quadrats to sample populations effectively within the grounds of Notre Dame. Fieldwork safety is considered and the use of keys to identify plants and invertebrates is undertaken.</p> <p>Discontinuous & continuous variation is explained with examples and is plotted on a graph further developing graph skills.</p>
9 Combined science – Trilogy	<ol style="list-style-type: none"> 1. Cell Biology 2. Organisation 3. Infection & response (part topic) 	The GCSE order of topics is based upon the specification. The textbook used to support learning is endorsed by the exam board and written by curriculum experts.	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p> <p>Mid topic multiple choice quiz</p>	<p>Continue to develop general practical skills including use of general laboratory equipment (e.g. glassware).</p> <p>Further develop specific skills on how to use a</p>



The lessons begin with the cells topic, building from key stage 3 and moving on from basic cell structure and function to more complex cellular interactions.

Organisation of systems allows a greater depth of knowledge and understanding of how the body works with a greater emphasis on practical work including dissections of heart and lungs.

The first part disease covers the different disease including bacterial and viruses as pathogens.

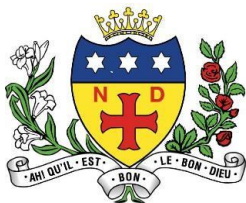
Required practicals are done within the context of the theory lessons and this supports students learning, putting theory into practice and continuing to develop practical and analytical skills.

Summative assessment is one test for each topic following the same structure as a GCSE exam paper. There are also two formal assessment weeks that students will be given advance warning of. These will assess several topics in the same paper.

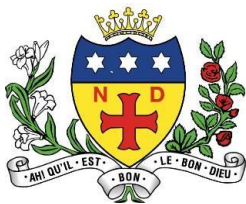
microscope in a required practical. Identifying parts of cell, varying the magnification and learning how to focus cells on microscope slides. Further development of skills to prepare microscope slides using thin specimens so light passes through and using mounted needles to minimise air bubbles.

Osmosis required practical provides the opportunity to plot a more complex graph with positive and negative scales along with developing practical skills of measuring volumes of solutions.

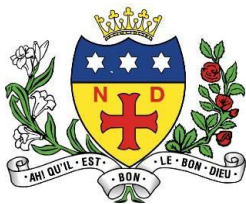
Use of pestle and mortars to prepare food samples for testing for a required practical.



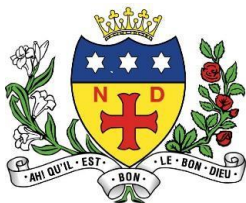
<p>10 Combined science – Trilogy</p>	<p>3. Infection & response (topic continued) 4. Bioenergetics 5. Homeostasis (part topic)</p>	<p>The later part of disease covers the way the body defends against disease including white blood cells, antibodies, vaccinations. The final part covers drug discovery and finishes with non-communicable diseases from lifestyle choices e.g., drug and alcohol misuse, linking back to key stage 3.</p> <p>Biogenetics covers photosynthesis, aerobic and anaerobic respiration which they have the basic knowledge from key stage 3. It then moves onto homeostasis and the nervous system, allowing students to understand the principles of how systems work together to allow us to respond to the environment. This also contributes to students gaining a greater depth of how the body works.</p> <p>The start of biological responses and genetics will follow the homeostasis topic of blood glucose and diabetes and then link back to key stage 3 for the menstrual cycle and extend the knowledge to controlling fertility by use of hormones.</p> <p>Required practicals are done within the context of the theory lessons and this supports students learning, putting theory</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p> <p>Mid topic multiple choice quiz</p> <p>Summative assessment is one test for each topic following the same structure as a GCSE exam paper</p> <p>There are also two formal assessment weeks that students will be given advance warning of. These will assess several topics in the same paper.</p>	<p>Photosynthesis required practical builds on earlier skills of following written practical instructions and results analysis with graph plotting.</p> <p>Assess safety considerations when testing leaves for starch.</p> <p>Reaction time practical provides opportunity for students to use a standardised conversion table for what they measure during the practical (cm) to a value of time (seconds) that can be plotted.</p>
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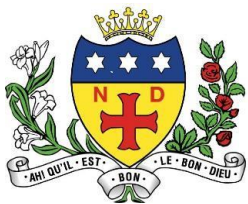
		into practice and continuing to develop practical and analytical skills.		
11 Combined science – Trilogy	<ul style="list-style-type: none"> 5. Homeostasis (topic continued) 6. Inheritance, variation & evolution 7. Ecology 	<p>The later section of biological responses and genetics focuses on inheritance including meiosis and DNA inherited disorders. The knowledge of DNA allows students to apply this to mutations and the realisation this can be beneficial and help evolution occur in the variation and evolution section. The topic continues with how organisms interact within an environment, with an emphasis on ecology.</p> <p>Required practicals are done within the context of the theory lessons and this supports students learning, putting theory into practice and continuing to develop practical and analytical skills.</p> <p>Required practical 9 is done in September of Y11 to ensure students are able to go outside to gain the relevant skills for sampling.</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p> <p>Mid topic multiple choice quiz</p> <p>Summative assessment is one test for each topic following the same structure as a GCSE exam paper</p> <p>There are formal two assessment weeks which give students the opportunity undertake a paper 1 in the autumn term and paper 2 in the spring term</p>	<p>Distribution required practical continues learning how to use quadrats to sample populations.</p>
9 Triple science - Biology	<ul style="list-style-type: none"> 1. Cell Biology 2. Organisation 3. Infection & response 	<p>The GCSE order of topics is based upon the order set out in the textbook. The textbook is endorsed by the exam board and written by curriculum experts. This aids student independent learning as they can access the textbook online, following the correct sequence.</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p>	<p>Continue to develop general practical skills including use of general laboratory equipment (e.g. glassware).</p>



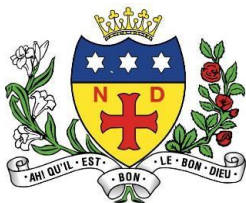
		<p>The lessons begin with the cells topic, building from key stage 3 and moving on from basic cell structure and function to more complex cellular interactions.</p> <p>Organisation of systems allows a greater depth of knowledge and understanding of how the body works with a greater emphasis on practical work including dissections of heart and lungs.</p> <p>In the disease topic, different diseases, including bacterial and viruses as pathogens are studied. The way the body defends against disease including white blood cells, antibodies, vaccinations is covered along with drug discovery focusing on clinical trials and the discovery of antibiotics. The topic finishes with non-communicable diseases from lifestyle choices e.g., drug and alcohol misuse, linking back to key stage 3.</p> <p>Required practicals are done within the context of the theory lessons and this supports students learning, putting theory into practice and continuing to develop practical and analytical skills.</p>	<p>Mid topic multiple choice quiz</p> <p>Summative assessment is one test for each topic following the same structure as a GCSE exam paper</p> <p>There are also two formal assessment weeks that students will be given advance warning of. These will assess several topics in the same paper.</p>	<p>Further develop specific skills on how to use a microscope in a required practical. Identifying parts of cell, varying the magnification and learning how to focus cells on microscope slides.</p> <p>Further development of skills to prepare microscope slides using thin specimens so light passes through and using mounted needles to minimise air bubbles.</p> <p>Use of agar plates to grow bacteria further refined with students using aseptic techniques to grow bacteria and investigating the effect of antibiotics.</p> <p>Osmosis required practical provides the opportunity to plot a more complex graph with positive and negative scales along with developing practical skills of</p>
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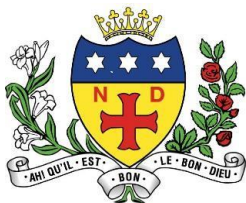
				<p>measuring volumes of solutions.</p> <p>Use of pestle and mortars to prepare food samples for testing for a required practical.</p>
<p>10 Triple science - Biology</p>	<p>4. Bioenergetics 5. Homeostasis 6. Inheritance, variation & evolution</p>	<p>Biogenetics covers photosynthesis, aerobic and anaerobic respiration which they have the basic knowledge from key stage 3. It then moves onto homeostasis and the nervous system, allowing students to understand the principles of how systems work together to allow us to respond to the environment. New concepts are studied including the brain and the eye. This also contributes to students gaining a greater depth of how the body works.</p> <p>Biological responses follow the homeostasis topic of blood glucose and diabetes and then link back to key stage 3 for the menstrual cycle and extend the knowledge to controlling fertility by use of hormones. Other homeostatic mechanism is also studied such as control of body temperature and the kidney's role in maintaining water content of the blood. The kidney is studied in more</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p> <p>Mid topic multiple choice quiz</p> <p>Summative assessment is one test for each topic following the same structure as a GCSE exam paper There are also two formal assessment weeks that students will be given advance warning of. These will assess several topics in the same paper.</p>	<p>Photosynthesis required practical builds on earlier skills of following written practical instructions and results analysis with graph plotting.</p> <p>Assess safety considerations when testing leaves for starch.</p> <p>Reaction time practical provides opportunity for students to use a standardised conversion table for what they measure during the practical (cm) to a value of time (seconds) that can be plotted.</p>



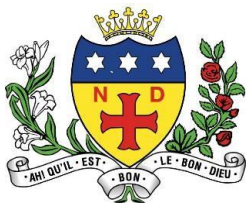
		<p>detail, focusing on transplants and dialysis. The topic also acknowledges that plants have mechanisms to control growth and how this can be used commercially.</p> <p>Genetics focuses on inheritance including meiosis and DNA inherited disorders. The knowledge of DNA allows students to apply this to protein synthesis and mutations and the realisation this can be beneficial to help evolution. This is extended to understand how mutations can affect human development. More in depth concepts of genetic engineering and cloning are also studied.</p> <p>Required practicals are done within the context of the theory lessons and this supports students learning, putting theory into practice and continuing to develop practical and analytical skills.</p>		<p>Growing seedlings practical investigates the effect of light on germination of seeds.</p>
11 Triple science – Biology	7. Ecology	<p>The evolution topic builds on Darwin’s ideas of natural selection and links with ideas of mutations from the previous topic. Knowledge and understanding are extended to cover how organisms interact within an environment, with an emphasis on ecology.</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p>	<p>Distribution required practical continues learning how to use quadrats to sample populations.</p> <p>Decay required practical improves identification techniques looking at a</p>



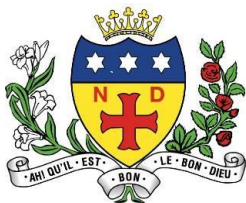
		<p>Required practicals are done within the context of the theory lessons and this supports students learning, putting theory into practice and continuing to develop practical and analytical skills.</p> <p>Required practical 9 is done in September of Y11 to ensure students are able to go outside to gain the relevant skills for sampling.</p>	<p>Mid topic multiple choice quiz</p> <p>Summative assessment is one test for each topic following the same structure as a GCSE exam paper</p> <p>There are formal two assessment weeks which give students the opportunity undertake a paper 1 in the autumn term and paper 2 in the spring term</p>	<p>colour change as an end point to a reaction. These data are plotted on line graph and the effect of temperature n enzymes can be concluded.</p>
12	<p>Section 1: Biological molecules</p> <ol style="list-style-type: none"> 1. Biological molecules 2. Nucleic acids <p>Section 2: Cells</p> <ol style="list-style-type: none"> 3. Cell structure 4. Transport across cell membranes 5. Cell recognition & immune system <p>Section 3: Organisms exchange substances with their environment</p>	<p>The A level biology course and order of topics is based upon the order set out in the textbook. The textbook is endorsed by the exam board and written by curriculum experts. This aids student independent learning as they can access the textbook online, following the correct sequence.</p> <p>A Level biology starts with a biochemistry unit that sets off the fundamentals of biological molecules such as carbohydrates, proteins and lipids. The interaction of these molecules forms the basis of many reactions and processes within the body. DNA is also studied in more detail than GCSE, looking at</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p> <p>Exam questions within lessons</p> <p>Homework booklets using past exam questions (teacher marked)</p>	<p>The development of practical skills starts with the food test practical and allows the identification of food groups in an unknown sample allowing students to develop analytical skills.</p> <p>Different CPAC criteria are assessed throughout the required practicals including use of syringes to measure volumes precisely, calculations of dilutions of solutions using</p>



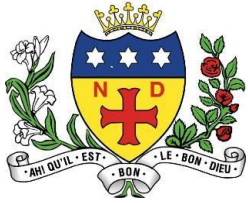
	<p>6. Exchange 7. Mass transport</p> <p>Section 4: Genetic information, variation and relationships between organisms</p> <p>8. DNA, genes & protein synthesis 9. Genetic diversity 10. Biodiversity</p>	<p>how the molecule has its specific alpha helix structure and how this helps in its role of providing the code for genes.</p> <p>The second section covers cells and builds upon existing knowledge of different types of cell but then delves deeper into the ultrastructure of cells and organelles, and how these can be seen with different types of microscopes. It naturally progresses into how molecules can move into cells and then how the specific cells of the immune system interact giving us immunity to certain pathogens.</p> <p>Section 3 begins to see the body as a whole rather than on a cellular and molecular level and looks at how substances travel around the body or plant. Some of these systems include circulatory, respiratory in mammals and movement of water and minerals and sugars in plants.</p> <p>The final section builds on the basic structure of DNA and how the genetic code allows proteins to be produced. Mutations are introduced and this is linked with diversity and variation within organisms and the environment.</p>	<p>Test yourself past exam questions (pupil marked)</p> <p>Required practical write up (teacher marked)</p> <p>Summative assessment is one test for each topic</p> <p>There are formal two assessment weeks which give students the opportunity undertake a paper in the spring term covering topics taught in the autumn term and a full paper 1 taken in the summer term</p>	<p>mathematical skills to calculate volumes, dissection skills improving identification skills and motor skills to cut organs open in a specific way, use of specific equipment such as cork borers, centrifuge & colorimeters, use of aseptic techniques and using liquid bacterial cultures to investigate the effect of antibiotics on bacterial growth.</p> <p>Mathematical skills are further developed in various ways including graph drawing, results table creation, use of standard form, interpretation of data presented in tables and charts and use of given formulas to calculate values, areas and ratios.</p>
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		<p>Required practicals are done within the context of the theory lessons and this supports students learning, putting theory into practice and continuing to develop practical and analytical skills. These practicals also cover mathematical skills. There are 6 required practicals in the year 12 course which are assessed using CPAC criteria set by the exam board.</p> <p>If the field course is attended in July, the section on ecosystems (see below for details) is studied before attending.</p>		
13	<p>Section 5: Energy transfer in and between organisms</p> <ul style="list-style-type: none"> 11. Photosynthesis 12. Respiration 13. Energy & ecosystems <p>Section 6: Organisms respond to change in their environment</p> <ul style="list-style-type: none"> 14. Response to stimuli 15. Nervous coordination and muscles 16. Homeostasis 	<p>Key life processes of photosynthesis and respiration are studied on a biochemical level, looking at the different reactions that occur to give one overall reversible reaction. Once the energy is released, there are many energy losses and these affect ecosystems so this is studied to explain where energy losses occur.</p> <p>Seeing the body as a whole is further continued by the teaching of the nervous system. How we respond to our environment, transmit nerve impulses and cause a response is key to how we survive. Homeostasis of blood glucose and osmoregulation is also studied and the problems that can occur</p>	<p>Formative assessment within lessons through questioning, mini whiteboards quizzes etc.</p> <p>Recall questions at the start of each lesson</p> <p>Exam questions within lessons</p> <p>Homework booklets using past exam questions (teacher marked)</p>	<p>Fieldwork skills is developed in detail over the course of the fieldtrip where students plan and carry out a required practical in ecology and analyse data.</p> <p>Mathematical skills from year 12 are added to by use and interpretation of 3 different statistical tests to analyse data.</p>



	<p>Section 7: Genetics, populations evolution and ecosystems</p> <ul style="list-style-type: none"> 17. Inherited change 18. Population & evolution 19. Population & ecosystems <p>Section 8: Control of gene expression</p> <ul style="list-style-type: none"> 20. Gene expression 21. Recombinant DNA technology 	<p>when the body cannot maintain a homeostatic mechanism is covered within the context of diabetes.</p> <p>To inherit characteristics links with the genetic code and protein synthesis studied at year 12. The probability of inheriting certain characteristics is studied in detail moving on from a simple monohybrid cross studied at GCSE to more complex dihybrid crosses and the influence of codominant genes.</p> <p>The studying of populations in their environment linking to survival and evolution is a fundamental part of Biology. Darwin's theory of natural selection is still the basis for evolution, but more recent research into DNA and gene expression shows there was some science in Lamarck's theory which was disregarded for many years.</p> <p>The advances in DNA technology have led to sophisticated medical testing and diagnosis, paternity tests and forensic science research to name a few. The previously little known 'PCR' test process is studied in detail and how it has become a useful tool in medical diagnosis.</p>	<p>Test yourself past exam questions (pupil marked)</p> <p>Required practical write up (teacher marked)</p> <p>Summative assessment is one test for each topic</p> <p>Synoptic essays</p> <p>There are formal two assessment weeks which give students the opportunity undertake a paper 1 in the autumn term of topics taught in year 12 and 13. The second assessment week gives the opportunity for students to undertake a paper 2 in the spring term. Paper 3 is carried out in lesson time prior to study leave.</p>	<p>Practical skills are broader and still focus of CPAC that students need. These involve use of quadrats and randomisation of placement when sampling and a systematic approach using a transect, handling organisms ethically, use of chromatography and calculation of Rf values, use of indicators and redox reagents to identify electron transport and plotting and using a calibration curve.</p>
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		<p>Required practicals are done within the context of the theory lessons and this supports students learning, putting theory into practice and continuing to develop practical and analytical skills. These practicals also cover mathematical skills. There are 6 required practicals in the year 12 course which are assessed using CPAC criteria set by the exam board.</p>		
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