North Hill House School Science Procedure

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Related policies & procedures include:	Curriculum Teaching and Learning Assessment and Progress Marking and Feedback

The purpose of this procedure:

- This procedure reflects the vision and values of North Hill House School. It ensures all stakeholders, including staff, governors, parents and students, are working towards the same goals.
- Set out a framework for all teaching and non-teaching staff, giving guidance on planning, teaching and assessment.
- Demonstrate how we consider the National Curriculum objectives and guidelines.
- Provide clear information to parents and carers about what their children will be taught.
- Allow all quality assurance leads to monitor the curriculum.
- Provide evidence of curriculum planning and implementation.

Contents:

Intent

1. Vision & Aims

This procedure relates to North Hill House School's Science curriculum intent (what we plan to teach and why), implementation (how we teach it) and the impact it has on our students. North Hill house believes in the concept of lifelong learning and the notion that learning should be a rewarding and enjoyable experience for all students. Through effective teaching, North Hill House School aims to equip students with the skills, knowledge and understanding necessary to be able to make informed choices about the important things in their lives. We believe that appropriate teaching and learning experiences help young people to lead happy and rewarding lives.

- At NHH our aim is to encourage enquiry and curiosity about nature and how the world around us works. Science is taught in a friendly environment in which students can develop the confidence to question, challenge and debate scientific ideas. Students are encouraged to develop a sense of responsibility towards the natural world and an understanding of the importance of ecology and conservation
- Through the study of science students learn skills needed for adulthood – the ability to work independently or with others, to question and challenge, to plan, review and make changes and to evaluate. As students progress through the curriculum, links are made to associated careers. An effort is made to impress upon students the diversity of potential science-related career paths and work placements.
- We encourage the development of character and attitudes intrinsic to science – integrity, honesty, respect for one's own and others' work, independence and resilience
- The science curriculum reflects the nature of the cohort of students. Every student is valued. Whilst allowing for individual abilities and requirements through differentiation, teachers aim to stretch and challenge students to achieve their personal best
- New students often arrive with a pre-conceived notion of science – often, that science is either boring or too hard or just for nerds. At NHH we aim to re-engage students through designing fun but educational lessons with a heavy STEAM or practical content. Students are encouraged to experience the science for themselves wherever possible
- At NHH students learn that science, technology and society are interrelated and as such science in the real world is influenced by social, economic, political, cultural and ethical issues (British values, SMSC)
- Students are encouraged to consider both the benefits and the limitations of science

Ownership: *including choices of activities, valuing student opinions, student-led discussions, students taking responsibility for their own work and tidying up after themselves, relating science to the real world, exposing students to new ideas in science, discussing careers in science*

Student-Led Inquiry: *with experience, students are encouraged to plan investigations which are then checked before implementation. This could include observations over time, looking for relationships between sets of data,*

exploring relationships between variables, using books and websites to answer questions

Reflection: *students reflect on their progress towards targets set for each topic. Personal reflection of learning and experiences deepens learning, encourages self-monitoring and can guide future approaches to learning.*

Teamwork

Collaborative Projects: *group tasks, for example, working together on practical assignments, debating current practices in medicine, environmental issues and research. Collaborative learning in science helps to develop the key skills of problem-solving, critical thinking, communication and project-management whilst preparing students for the real world in professional environments. Collaborative work is also important for helping students to negotiate diverse perspectives and arguments*

Peer Feedback: *students sometimes mark each other's work and make suggestions for improvement, fostering mutual support and shared responsibility.*

Thoughtfulness

Empathy and Perspective-Taking: *debating current practices in medicine, environmental issues and research, considering the views of others and responding appropriately to these*

Critical Thinking: *understanding in science is based on analysis, evaluation and reaching a conclusion. Testing and solving problems is a vital element of science and helps to drive progress in the real world. To build critical thinking skills, in science we adopt an inquiry-based approach in which students are encouraged to think for themselves, to question, evaluate and voice their opinions and reasoning*

Excellence

High Expectations: *in science we set high expectations that are personal to each student. We set clear learning objectives with goals for each lesson that are individualised if appropriate. We place strong focus on praise and acknowledgement of effort and improvement. Lessons usually start with a short retrieval exercise that helps students to retain their knowledge. Students have opportunities for homework if requested*

Skill Development: *science lends itself to the teaching and practice of key skills including inquiry and investigation, observation and measurement, data handling and analysis, communication, critical thinking, problem solving, teamwork and creativity*

Resilience

Challenging Content: *tackling complex or sensitive topics (e.g., genetic engineering, fertility treatments, climate change) with support, encouraging students to consider viewpoints contrary to their own and to learn how to disagree respectfully*

Growth Mindset: *in science lessons students are taught that mistakes when tackled are positive as they foster deeper learning and understanding. Science topics encourage curiosity, experimentation and critical thinking. We celebrate student work by posting pictures on our student display board and achievements are mentioned in our weekly assembly and rewarded by Dojos and recognition of Otter values.*

Safety

Respectful Environment: *establishing ground rules for discussing sensitive or controversial topics, ensuring all voices are heard and respected. Setting and following key safety practices – use of lab coats, goggles, gloves, keeping long hair tied back, hazard signs on chemicals. Safety in the lab helps to foster responsibility*

Emotional Awareness: *providing support when exploring distressing content and allowing space for students to process and respond appropriately.*

2. Curriculum Overview

Notes

- Additional information can be found in the curriculum overview document

	BIOLOGY	**CHEMISTRY**	**PHYSICS**
KS1 **Years 1 - 2**	Year 1 Common animals and their structure What animals eat Structure of the human body, and the senses Year 2 Reproduction What animals need to survive The importance of food and exercise in humans Identifying common plants Basic plant structure The requirements for life of plants Water transport in plants The life cycle of flowering plants Plants from seeds and bulbs What plants need to grow Dead or alive? Habitats Simple food chains	Year 1 Identifying everyday materials Identifying properties of everyday materials Year 2 Uses of everyday materials Changing shape	Year 1 Seasonal changes

KS2 **Years 3 - 6**	<u>Year 3</u> Nutrition <u>Year 4</u> The digestive system Human teeth Constructing food chains Grouping living things Dangers posed by environmental change <u>Year 5</u> Ageing in humans Animal life cycles Reproduction in plants and animals <u>Year 6</u> The human circulatory system The impact of lifestyle on the body Nutrient and water transport in animals Classification Evolution Adaptation	<u>Year 3</u> Grouping rocks Solids, liquids and gases Changes of state <u>Year 4</u> The water cycle <u>Year 5</u> Grouping everyday materials according to their properties Uses of everyday materials	<u>Year 3</u> Light and dark Forces between objects <u>Year 4</u> Sound and vibrations Pitch and volume Electricity – appliances and simple circuits Conductors and insulators <u>Year 5</u> The Sun, the Moon and the Earth Day and night The heliocentric model Gravity Forces between objects Levers and pulleys <u>Year 6</u> Light travels in straight lines How we see things Circuit symbols Cells and voltage
KS3	Organisms – Movement, cells, breathing, digestion Ecosystems – Interdependence, plant reproduction, respiration, photosynthesis Genes – Variation, human reproduction, evolution, inheritance	Matter – The particle model, separating mixtures, elements, the periodic table Reactions – Acids and alkalis, metals and non-metals, types of reaction, chemical energy Earth – The structure of the Earth, the universe, climate, Earth's resources	Forces – Speed, gravity, contact forces, pressure Electromagnets – Potential difference and resistance, current, magnetism, electromagnets Energy – Energy costs, energy transfer, work, heating and cooling Waves – Sound, light, wave effects, wave properties
KS4 **Possible accreditation:** Entry level science single or double award GCSE Trilogy science (double award) We sometimes teach alternative courses at KS4 to cater for students with particular needs or preferences	Cell structure and transport Cell division The digestive system The circulatory system Breathing Tissues, organs and transport systems in plants Disease and treating disease Photosynthesis Respiration The human nervous system Hormonal control Reproduction Variation and evolution Genetics and evolution Ecology – adaptations, competition, interdependence, cycles, pollution, biodiversity	Atomic structure The periodic table Structure and bonding Chemical calculations Chemical change Electrolysis Energy changes Crude oil and fuels Chemical analysis The Earth's atmosphere The Earth's resources	Energy stores Energy and appliances Energy transfer by heating Energy resources Electric circuits Electricity in the home Molecules and matter Radioactivity Forces in balance Motion Force and motion Properties of waves The electromagnetic spectrum Electromagnetism

Implementation

3. Teaching and learning

Science is taught in small groups by class teachers. Lesson plans are based around the subject's curriculum overview and resources available, with objectives adapted to suit the stage of development for the students in each class. The teaching of science might involve:

Whole-class teaching
Practical work – individually or in pairs
STEAM work – using craft items to build models or representations
Reading from textbooks
Group discussions or debates
Retrieval exercises
Working in small groups
Research
Field trips

Whole school learning approach
Literacy – students practice their literacy skills through learning new vocabulary, help with spelling and remembering difficult terms, explaining derivations of words, reading from textbooks or protocols, writing extended answers, encouraging explanations of answers and opinions, discussion
Numeracy – numeracy is a necessary part of science providing the ability to handle data, and to estimate, predict, clarify and explain. Students will practice a number of mathematical skills as they progress through the curricula including calculating a mean, using significant figures, estimating, data collection, converting between units, geometry, weighing and measuring and solving equations
SMSC – science lends itself to a number of potentially contentious subjects such as the testing for inherited diseases in pregnancy, climate change, the exploitation of adult and child workers in the mining of precious metals and minerals – such topics are handled very sensitively, and students are supported to express their own beliefs and to respect the beliefs of others
British values – students are encouraged to respect each other and staff, to respect different viewpoints, beliefs and interpretations and to allow democratic discussion. We have a set of rules for the safety of all students and staff in the lab and students are expected to abide by these with support available if necessary
Online safety – student use of computers is monitored at all times during lessons. Any unacceptable or worrying use is reported immediately.

4. Assessment and monitoring progress

North Hill House School uses assessment to enable staff to understand what students have learnt before, what they need to learn now and what they will learn next.

As per school policy, students are assessed at two assessment points in a half term topic. This may be in the form of a test, independent question or piece of work, or may be more discrete, depending on the needs of the student.

Students learn of their progress in each subject through 'subject overview sheets' and are given the opportunity to improve a piece of work after assessment. Students can see if they have 'not quite, nearly, achieved or exceeded' a learning outcome.

Teachers use assessment to make decisions on whether a student is working above, at or below each curriculum level. For example, a student following a Year 7 curriculum may be working at 7- (just below a Y7 level), 7= (at Year 7 level) or 7+ (working above a Y7 level)

Baseline Assessment – Baseline assessment takes place at the beginning of a new school year providing information of the level at which students are currently working and any gaps in skills or knowledge. Assessments test the recollection and understanding of topics covered in the previous year or key stage.

Formative assessment – assessment for learning is an integral part of all lessons. Assessment can take the form of a quiz, use of mini whiteboards to indicate answers on, drawing and/or labelling, cloze exercises, matching exercises eg words and definitions, mind maps, verbal directed questioning, thumbs up or down, bingo, think and share, one-minute papers

Summative assessment – usually takes the form of a written test completed at the end of each topic. At GCSE level, students will complete mock exams.

Marking & Feedback – books are marked regularly with positive feedback that may include suggestions for improvement. At the end of a topic more detailed feedback is given. At the start of a new topic, students are given a written set of objectives which they can comment upon in terms of their level of understanding

5. Roles and responsibilities

Teacher	Role
Steph Thomas	Science Lead KS4 GCSE teacher
Joe Gosden	KS3 teacher
Matt Davis	Primary/KS3 teacher
Heather Chapple	Primary/KS3 teacher
Chris Chilcott	KS4 Entry Level course teacher

Laura Van-dyke	Primary science teacher
Katrin Faulkes	Primary science teacher
Matt Croft	Primary science teacher