

## **NHGS – Chemistry - Curriculum Intent, Implementation and Impact**

### **Intent (Aims and purpose)**

We aim to create the very best scientists. We challenge students to think, act and speak like those working in the field would. We do this by using effective questioning techniques in each lesson to push our students to think beyond their first response. They are expected to carry out practical work in each topic, where it is appropriate, in a responsible manner and record data effectively in order to be able to analyse it and draw conclusions from it.

Keywords are vital in Chemistry and are provided on each topic checklist in an unambiguous manner in order to allow students to recognise them. A glossary of terms is also provided to help any students who may need further clarification on the meaning of the keywords.

Teachers use these words during lessons and expect verbal responses from students to include appropriate scientific language.

Our curriculum at NHGS goes far beyond what is taught in lessons, for whilst we want students to achieve the very best examination results possible, we believe our curriculum goes beyond what is examinable. As a department we provide a lunchtime science club for the younger students, lunchtime drop-in sessions for older students, lunchtime sessions to prepare Year 12 students for the Cambridge Chemistry Challenge competition and Year 13 students for the RSC Chemistry Olympiad. We also provide personalised mock interviews for those applying to universities where interviews play an important role in the application process. Year 13 students, with the support of the Chemistry Department, provide a lunchtime meeting for those wishing to study Medicine at university where Year 12 students can go along and gain information about the application process from Year 13 students. Year 10 students have been given the opportunity to attend lectures at Salford University. Sixth Form students have also been given the opportunity to mentor students lower down the school and take part in lower school lessons, gaining valuable experience in communication skills and organisation.

Our curriculum in Chemistry forms a backbone to our ethos statement. Examples of how our curriculum supports the ethos statement are:

Enthusiastic and motivated teachers give up their own time to go above and beyond for students, from science clubs and trips to lunchtime sessions. Creative teachers produce quizzes, logic problems, projects, practical sessions and interactive lessons with hands-on tasks. Confident and mannerly teachers encourage students to achieve through positive relationships in the classroom. Enthusiastic, engaged, motivated and mannerly students want to attend events and clubs, but also, older students volunteer to help and support the younger students in lessons. Enquiring and motivated students attend sessions provided by teachers to prepare for external Chemistry competitions. The department, including the technical support staff, is co-operative and works as a team with discussions every day sharing ideas and offering each other help and advice.

As a knowledge engaged curriculum we believe that knowledge underpins and enables the application of skills; both are entwined. As a department we define the powerful knowledge our students need and help them recall it by providing detailed checklists for each of the 34 topics we teach. Each lesson begins with a quick quiz which helps the students to recall key knowledge from previous topics as well as from the previous lesson. Each student from Year 8 upwards has a login for Kerboodle where tasks are set involving interactive quizzes, crosswords, drag and drop exercises etc in order to provide low stakes memory recall opportunities.

We build the Cultural Capital of our students by including examples of the implications of the chemical changes we, as a human race, are causing in our world. Examples include global warming, the overuse of fertilisers, the fact that some raw materials are running out and that techniques for mining them have an impact on the environment. We teach a topic about reduce, reuse, recycle in Year 11 and discuss plastic pollution in Year 8.

Further rationale behind our curriculum design includes choosing to teach certain topics in an order which provides students with the opportunity to practise their skills alongside the knowledge they are gaining. Topics have been chosen to interleave practical/skills-based topics with more theoretical ones where possible. Many topics, for example acids and calculations, are taught on a spiralled curriculum throughout the year groups to make learning stick and to develop deeper knowledge on the foundations taught lower down the school. Other topics which are knowledge-based and have been identified as being ones in which questions on the content were not successfully answered in end of year examinations, for example ions tests, have been brought forward to the beginning of Year 11 in order to give teachers the opportunity to make learning stick through quick quizzes and tests, including mocks.

### **Implementation**

Collaborative curriculum planning lies at the heart of what we do in the department. We are committed to a three-year plan of developing our schemes of work. In 2019/2020 we are working on KS4 schemes of work. These are focussed on embedding challenge, metacognition, memory techniques and literacy into our departmental curriculum.

Alongside our schemes of work, we are developing knowledge organisers at KS3. This is enabling us to define the core knowledge our students need to master.

In Chemistry we also implement our curriculum through the use of a variety of teaching approaches and tasks such as practical work, demonstrations, videos, project work, Kerboodle, GCSEPod, quick quizzes, group work and whiteboard Q and A.

### **Impact**

We know our curriculum is working in the Chemistry department as a large number of students (approx. 60 each year) take A level Chemistry. A level results for 2019 included 54% A\*- B and 83% A\*-C. 23 students in 2018 continued their studies at university with courses requiring the use of chemistry. For the academic year 2019/20 there are 20 students who have chosen to apply for Medicine, Dentistry or Veterinary Science with competitive predicted grades. The percentage of 9-7 grades increased by 10% from the previous year in the GCSE results for 2019.

Student voice:

*Really friendly teacher and great vibe in class.*

*I enjoyed the weekly quiz in teams and it was good at recapping work.*

*I find chemistry very interesting. It is a fun and exciting subject that is very important in today's modern world. It has hard sections that are challenging but that is part of the appeal of the subject. Also there are many opportunities for experiments that are fun and exciting, especially some of the organic ones.*

*I have enjoyed the NMR topic, I found it rather fun, it is exciting working away at the puzzle trying to work out the structure of the molecule.*

*Once again thank you for being such a brilliant teacher these past 2 years!!*

*Thank you for being such good teachers I am very happy with my results.*