Biddulph High School Curriculum Intent

To deliver a broad and enriching curriculum through engaging and challenging lessons that provide a wide range of opportunities for all students to achieve their potential.
Students will all be prepared to take their next steps in a diverse and ever changing future ready to make a positive contribution to society.
Through a broad programme of extracurricular activities students will have the opportunities to showcase their talents and experience new challenges.
We value individuals and all that they can offer as well as supporting each other with kindness and empathy.

Curriculum Intent for Chemistry: Year 9

The lessons in the Science department provoke students' curiosity through exciting lessons; creating an environment where students will need to critically think and provide logical reasoning using various methods of investigation, such as observation, comparison, experimentation, and mathematical manipulation of data.

All teachers will follow the schemes of work provided by the department. This will ensure that all students receive the same high-quality provision. All units of work will provide a clear outline of the knowledge and skills required and assessments will ensure that this knowledge has been retained and that skills can be evidenced.

Teachers will ensure that gaps are closed through regular monitoring within the classroom. DINT activities will allow for interleaving and recap of previous learning. Misconceptions will be identified through effective questioning and the regular inspection of student work.

Chemistry **Long Term Overview**						
Year Group	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
9	Particle and atomic theory. Introduction to methods of separation	Introduction to methods of separation	Investigations into methods of separation.	The rock cycle	Chemical Reactions	Acid – Base Chemistry
10						
11						Examinations
12						
13						Examinations

Chemistry: Medium Term Overview

Year 9	Autumn Term 1	Unit Title: Atomic model and methods of separation.	No of Lessons: 12

Overview/Intent

- Develop scientific knowledge and conceptual understanding through the specific disciplines of Chemistry.
- Develop understanding of the nature, processes and methods of science, through different types of scientific enquiries that help them to answer scientific questions about the world around them.
- Develop and learn to apply observational, practical, modelling, enquiry and problem solving skills in the laboratory, in the field and in other learning environments.
- Develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.

Assessment

Essential Knowledge (what must students know):

- Particle Theory
- Atomic structure
- Methods of separation

Terminology:

Atomic Theory: Particle, Atom, element, compound, mixture, protons, neutrons, electrons

Practical equipment: Learn the names of the equipment used in Chemistry

Names of models of the atom: Plum pudding and Planetary models.

Practical Skills:

Students will carry out a range of investigations and learn the key terms such as control, dependant and independent variable.

Essential Skills (what must students be able to demonstrate):

Students will be able to:

- Recognise the different atomic models and link to the scientists who developed them limited to Dalton, Thompson, Rutherford and Bohr.
- Know the sub atomic particles and which are nucleons and be able to explain the charge on the nucleus and also the overall charge on the atom.
- Recognise the best ways to represent a molecule and explain how to improve it.
- Make links to the particle models and use this to explain how solids, liquids and gases behave.
- Explain the energy associated with solids, liquids and gases.
- Calculate RFM for a range of molecules.

Lessons:

1. KS3 atoms. Students will be able to define and recognise elements, compounds and mixtures.
2. Particles. Solids liquids and gas particle model
3. Atomic Structure. Looking at the sub-atomic particles and learn the charge and masses of each.
4. Limitations of the particle model – Recognise how the particle models can be limited and explain WAGOLL
5. Developing the atomic model – Research into the scientists who proposed models of the atom.
6. Chemical and physical changes – Investigation into signs of a chemical and physical change.
7. Composites – Learn about the different types of materials in the Earth
8. RFM – Calculations including S&C of relative formula masses
9. Pure Vs impure – Looking at what makes substances pure – Practical investigation.
10. Filtration – Practical looking at when to use filtration as a method of separation.

Students will complete the investigation sheets that link to POAE skills and criteria.	• Recognise specific pieces of laboratory equipment linked to methods of separation • Work safely in a laboratory.	11. Distillation –correctly label a Liebig Condenser and explain using the particle model the process of distillation. 12. TEST
Careers Links: Nuclear physics with particle models. Laboratory work. Analytical chemist. Medicinal chemist. **Homework** SENECA learning and examination style questions to support learning and improve skill.	**Enrichment:** Students will be taught about the work carried out at CERN which is an educational visit. The atomic model is a developing model and how the Large Hadron Collider has lead to the discovery of the 'God' particle – the Higgs Boson.	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Chemistry **Medium Term Overview**

Year 9	***Spring Term 2***	**Unit Title: Methods of separation and the Rock Cycle.**	**No of Lessons: 13**
Overview	**Develop practical investigation skills and confidently complete PAG sheets designed by LTO to enable good understanding of the terminology used in practical investigations.** Develop scientific knowledge and conceptual understanding through the specific disciplines of Chemistry. • Develop understanding of the nature, processes and methods of science, through different types of scientific enquiries that help them to answer scientific questions about the world around them. • Develop and learn to apply observational, practical, modelling, enquiry and problem solving skills in the laboratory, in the field and in other learning environments. • Develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively		
Assessment	PAG sheets and end of unit test		

<u>Essential Knowledge (what must students know):</u>

- Particle theory linked to S L G
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Terminology:
Separation: Distillation, chromatography, Rf, Mobile and stationary phase, crystallisation.
Equations: Reactants, products.
Rock cycle: Sedimentary, metamorphic, igneous, weathering, transportation, deposition, cementation, compaction.

Practical Skills:
Students will carry out a range of investigations and learn the key terms such as control, dependant and independent variable.

<u>Essential Skills (what must students be able to demonstrate):</u>

Students will be able to:

- Design and carry out an investigation to choose correct methods to separate a mixture of substances.
- Give examples of how to check for purity of a substance
- Extract information using VIPERS to build both word and symbol equations.
- State the three forms of weathering of rocks.
- Identify features of sedimentary, metamorphic and igneous rocks.
- Explain how plate movement can bring about phenomena such as mountains, volcanoes and earthquakes.

Lessons:

1. Chromatography. Investigate how chromatography can be used to separate a mixture of chemicals.
2. Checking Purity. Investigate how impurity affects the physical properties of substances, linking to uses (salt on the road in the winter)
3. Experiment PAG
4. Experiment PAG
5. End of topic test
6. Word Equations. Students will learn how to build word equations from information given in an examination question.
7. Symbol equations. Students will learn how to successfully build symbol equations from information given in an examination question and then balance the equation,

		8. Weathering. Students will study biological, chemical and physical weathering through practical investigations. 9. Deposition. Investigate how weathered rocks are transported and deposited leading to the formation of sedimentary rocks. 10. Metamorphic rocks. Investigate the affects of plate movement on the changes to sedimentary rocks. 11. Igneous rocks. Investigate the formation of igneous rocks and how the rate of cooling leads to the formation of extrusive and intrusive igneous rocks. 12. Plate tectonics. Students will study the hypothesis set by Alfred Wegener of Pangea. 13. Volcanoes. Plate movement
Careers Link: Forensics and police work. Volcanology, Geologist. **Homework** SENECA learning and examination style questions to support learning and improve skill. Project for the content on rock cycle	**Enrichment** Students will be taught about the role of geology in chemistry and how the topics they are studying link to the trip to Ecton copper mines in the A Level studies.	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Chemistry **Medium Term Overview**

Year 9	***Summer Term 3***	**Unit Title: Green Chemistry and Acid/ Base Chemistry**	**No of Lessons: 13**
Overview **Assessment**	**.** Develop scientific knowledge and conceptual understanding through the specific disciplines of Chemistry. • Develop understanding of the nature, processes and methods of science, through different types of scientific enquiries that help them to answer scientific questions about the world around them. • Develop and learn to apply observational, practical, modelling, enquiry and problem solving skills in the laboratory, in the field and in other learning environments. • Develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively PAG sheets and end of unit test		

Essential Knowledge (what must students know):	**Essential Skills (what must students be able to demonstrate):**	**Lessons:**
• Knowledge of greenhouse gases and the human impact on planet Earth • Chemical reactions • Acid/base reactions • Neutralisation reactions **Terminology:** **Green Chemistry**: Greenhouse gases, global warming, pollution, climate change. **Acid / base chemistry**: Neutralisation, pH, hydrogen ions, acid, base, alkali. **Practical Skills:** Students will carry out a range of investigations and learn the key terms such as control, dependant and independent variable.	**Students will be able to:** • Link the human impacts of deforestation and burning fossil fuels and animal consumption to the increased levels of carbon dioxide and other greenhouse gases • How global warming leads to climate change, shifting of the seasons and loss of habitats. • REDOX – a combination of both reduction and oxidation and how to determine each with the loss and gain of both oxygen and also electron transfer. • Ba able to apply the mnemonic OILRIG	1. Pollution- SOx, NOx and COx production. 2. Global warming- research the human impact on global warming. 3. Climate change – research the impact of global warming on our planet and look into alternative resources. 4. Test 5. Redox reactions. Learn about reduction and oxidation reactions and how to recognise REDOX. 6. pH scale. Investigate the pH of household products. 7. Neutralisation – Students will investigate the neutralisation of an acid using a range of indicators and a pH meter. 8. Reactions of acids. Students will investigate the reactions of acids with metals.

Graphical skills when looking at titration curves and interpreting the graph to determine the volume required for neutralisation and also equivalence point to choose a suitable indicator.	• Understand the logarithmic scale of the hydrogen ion concentration and how pH can determine the identity of an acid and a base. • Recognise neutralisation reactions and the salt and other products formed based on the reactants.	9. Reactions of acids. Students will investigate the reactions of an acid with a metal carbonate. 10. PAG Production of copper sulphate. 11. pH and [H+]. Students will link the hydrogen ion concentration to the pH and also the use of HA showing dissociation. 12. Making an indicator. Students will produce their own indicator from beetroot and test on an acid and an alkali. 13. Test
Careers Farming. Politician. Environment scientist. **Homework** SENECA learning and examination style questions to support learning and improve skill.	**Enrichment.** Students will be given a task to grow their own ionic crystal at home and write up how the crystal grows, looking at the environmental factors affect the crystal structure.	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require aspects of the social me strand **Thinking Me – evaluating & creativity** Evaluation will be utilised when assessing data from investigations **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons