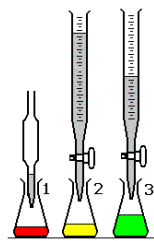


# Chemistry Learning Journey

YEAR  
11



How can we explain the properties of alloys?

How is electroplating of metals carried out and why?



What are the properties of typical transition metals?



How can we calculate the number of protons, neutrons and electrons in an atom?

How is ammonia produced?

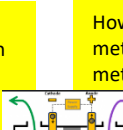


How was the Periodic Table developed?

How are the elements arranged in the modern Periodic Table?



How can we decide which method of extraction to use for metals?



What useful products can be made using electrolysis?

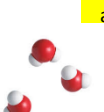


How do you calculate the number of moles of a substance?



What are the properties of ionic compounds?

What are precipitation reactions?



What does the pH tell us about the ions in a solution?

What are the properties of molecular substances?

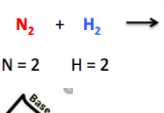
How do we balance a chemical equation?



What are the properties and uses of alkanes, alkenes, alcohols and carboxylic acids?



How do we make different polymers and why are they so useful?



What are the factors that affect the rate of a chemical reaction?



How do metals react with acids, water and other metal compounds?



What are fertilisers, and how is the Haber process used to make them?



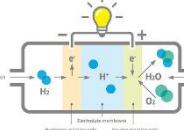
What is a life cycle assessment for a new product?

How does sacrificial protection prevent rusting?



How do we calculate concentrations of solutions from acid-alkali titrations?

Why do batteries go flat? What are fuel cells?



What are the properties and reactions of Group 1, 7 and 0?



How can we investigate exothermic and endothermic reaction?



Why is crude oil so useful?

What evidence is there for the composition of the early atmosphere?



What are the properties of metals, ceramics and polymers?

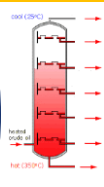


What are the uses and possible risks of nanoparticles?



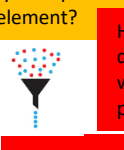
YEAR  
10

How has the model of the atom changed over the past 200 years?



How is drinking water produced?

How can filtration be used?



How can we describe and identify isotopes of an element?

How are electrons arranged in an atom?

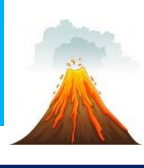


What are the properties of ceramics and polymers?



How are ions formed? What is an ionic bond?

How are covalent bonds formed?



How are igneous and metamorphic rocks formed?

How can we describe different rocks?



How can we use the reactivity series to extract metals from ores?



How can we calculate Rf values in chromatography experiments?

How do melting points help to identify purity?

How can burning fuels cause pollution and climate change?



How do we deal with anomalous results?

What happens during rusting and corrosion?

How do metals react with water and acids?



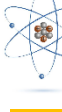
How do we get energy from chemical reactions?



How can we decide how reliable source materials are?



What are atoms like?



YEAR  
8

How can we use chemical reactions?

What are facts and opinions?



What forms when fuels and metals react with oxygen?

Why do scientists carry out fair tests?

How does information and explanation text differ?

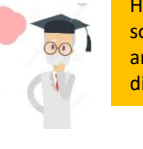
What are elements and compounds? How are compounds formed?



What evidence led scientists to accept the particle theory?



How are solids, liquids and gases different?



How can scientists use language effectively?



How can we make use of Neutralisation?

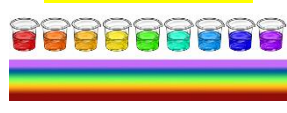
How can you summarise information?



What happens when an acid is added to an alkali?



How can we measure how acidic or alkaline a solution is?

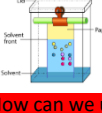


How can we use indicators to classify solutions?

How do we deal with hazardous chemicals?



How can we use chromatography to separate solutes for identification?



How do we get solids out of a solution?



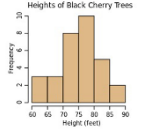
Why do some people use filters for tap water?



What kinds of Mixture are there?



How can we record and present scientific data?



Why do some substances spread out? What is pressure?

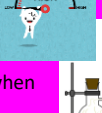
What is the particle theory of matter?



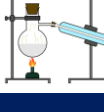
What is the difference between a hypothesis and a theory?



How dangerous are chemicals in the home?



How can we reduce risks when carrying out experiments?



How do we make sea water drinkable?



How do we heat solutions safely using a Bunsen burner?



YEAR  
7



welcome

# Chemistry Big Ideas

In the curriculum pupils progress on their learning journey towards an understanding of the key ideas in chemistry. These “big ideas” are shown below and are colour coded so that you can see where the ideas repeat along the journey so as to consolidate learning and deepen understanding.

- **BIG IDEA: SUBSTANCES AND PROPERTIES** - Materials are either made of a single chemical substance or a mixture of substances which each have distinctive properties.
- **BIG IDEA: PARTICLES AND STRUCTURE** - All matter is made up of atoms. The behaviour and structural arrangement of atoms explains the properties of different materials.
- **BIG IDEA: CHEMICAL REACTIONS** - During a chemical reaction, atoms are rearranged forming new substances.
- **BIG IDEA: EARTH’S ATMOSPHERE** - The composition of the Earth’s atmosphere depends upon the balance of substances that are continually entering and leaving it. This affects the Earth’s climate.
- **BIG IDEA: DYNAMIC EARTH** - The Earth’s crust is constantly changing as new rocks are formed and older rock is worn away.
- Literacy in Science – developing the skills to be a good communicator of science.
- Working Scientifically- developing the skills necessary to carry out scientific investigations and to understand how scientific ideas are developed.

# Physics Big Ideas

- **BIG IDEA: MATTER** - Objects are made of particles with mass. Understanding particles helps us to design our world.
- **BIG IDEA: FORCES AND MOTION** - Forces make things change. Understanding forces helps us to predict and control physical change.
- **BIG IDEA: SOUND, LIGHT AND WAVES** - Waves radiate information. Understanding waves helps us to communicate.
- **BIG IDEA: ELECTRICITY AND MAGNETISM** - The everyday world is largely a consequence of electrical charge. Understanding electricity and magnetism helps us develop technology to improve lives.
- **BIG IDEA: EARTH IN SPACE** - Understanding the uniqueness of the Earth and the vastness of space gives us perspective and awe.

- Chemistry Learning Journey in Units from Exploring Science:

#### Year 7

- 7E Mixtures and Separation
- 7F Acids and Alkalis
- 7G The Particle Model
- 7H Atoms Elements and Molecules

#### Year 8

- 8E Combustion + Begin the Unit with 8Fa Dalton’s Atomic Model, 8Fb Chemical Properties.
- 8G Metals and Their Uses (+ 9Fc Energy and Reactions, 9Fd Displacement, 9Fe Extracting Metals)
- 8H Rocks (+ 9Ea About Ceramics, 9Eb Polymers)

#### Year 9

- Sc1 -2 States of Matter and Methods of Separation
- Sc3-4 Atomic Structure/ Periodic Table

#### Year 10

- Sc5-7 Ionic and Covalent Bonding/ Types of Substance
- Sc 8 Acids and Alkalis
- Sc 9 Calculations involving masses.
- Sc 10-13 Electrolytic Processes/ Obtaining Metals/ Reversible Reactions/ Transition Metals

#### Year 11

- Sc 14-16 Quantitative Analysis/ Dynamic Equilibria/ Fuel Cells
- Sc 17-19 Groups in the Periodic Table/ Rates of Reaction/ Heat energy changes
- Sc 20-21 Fuels / Earth and Atmosphere
- Sc 22-24 Hydrocarbons/ Alcohols/ Polymers
- Sc 25-26 Qualitative Analysis/ Bulk and Surface Properties.



# Biology – Big Ideas

- **BIG IDEA: THE CELLULAR BASIS OF LIFE** - Organisms are made of one or more cells, which need a supply of energy and molecules to carry out life processes.
- **BIG IDEA: HEREDITY AND LIFE CYCLES** - Genetic information is passed from each generation to the next; this information and the environment affect the features, growth and development of organisms.
- **BIG IDEA: ORGANISMS AND THEIR ENVIRONMENTS** - All organisms, including humans, depend on, interact with and affect the environments in which they live and other organisms that live there.
- **BIG IDEA: VARIATION, ADAPTATION AND EVOLUTION** - Differences between organisms cause species to evolve by natural selection of better adapted individuals. The great diversity of organisms is the result of evolution.
- **BIG IDEA: HEALTH AND DISEASE** - Organisms must stay in good health to survive and thrive; the health of an individual results from interactions between its body, behaviour, environment and other organisms.