KS3 Science skills and knowledge at a glance

KS4

Key

- Energy
- Forces
- Numeracy
- How science works + practical skills
- Anatomy
- Evoloution and ecosystems
- Elements and reactions
- The Earth and Space

Explosions and gasses

Diffusion – idea has been shown many times, explicitly explain in different contexts like gas exchange. Link to particle theory and use to explain gas pressure and expansion. Links to balanced forces
Testing for gases – observational chemistry and reactions with gases linking to particle theory

Year 9 Topic 6

Force-fields and electricity

Static electricity , Current electricity – conceptually challenging so wait until y9. Links particles, energy and forces. Electricity investigations and calculations
Contact and non contact forces – detail on how forces transfer energy and the generating electricity from force. Inlcude magnatism from y7

Year 9 Topic 4

Acids and reactivity

Acids and bases – continues concept of ions and balancing equations
Concentration – introduce the concept of molarity
pH – logarithmic scales
Acids and metals – observational chemistry and varibales

Year 9 Topic 2

The earth through time

Early atmosphere and volcanoes , Rock cycle – Taught in geography in the spring term. Recap of respiration and photosynethises
Fossils – formation of fossils and evidence of evolution
Fossil fuels – introduction to hydrocarbons and environmental impact
Mining and recycling – environmental impact and link to displacement.

Year 8 Topic 6

Transport systems

Circulatory system – dissection of heart. Links to healthy living from y7
Respiratory system – dissection of lung. Links to smoking from y7
Plant transport – links to specialised cells and microscopy work
Respiration and photosynthesis. Links to chemical reactions and balancing equations

Year 8 Topic 4

Physics in biology

Energy – First introduction to energy explicitly including stores and transfers. Calculations of efficiency
Light waves and sound waves as transfers of energy. Links to the human ear and eye as biological context.

Year 8 Topic 2

Physics of superheroes

Contact forces and non-contact forces – looking at resultant force and investigative work
Planning and improving invetisgations, inc. variables
Hooke's law – calculations and proportionality
Force fields – using non contact forces to look at magnetism and very basic electricity

Year 7 Topic 6

Atoms and elements

Atoms – basic structure and particle theory
Compounds and molecules – naming and differences
Periodic table – metals and non metals. Uses and properties
Types of reaction – Using observation to identify different reactions based on measurements .

Year 7 Topic 4

Survival in the wild

Predator prey interactions – basic food webs , chains and interdependence
Reproduction – male and female anatomy. First introduction to cells and a mention of genes/DNA
Adaptations- basic link between orgasnisms anatomy and how it links to evolution
Simple taxonomy

Year 7 Topic 2

START

Year 7 Topic 1

Murder mystery

Separation techniques – filtration, evaporation and chromatography
Scientific observations – Flame tests, colour changes
Scientific recordings – writing methods
Safety – safety symbols, lab safety and practical safety

Year 7 Topic 3

Space

Bodies in space – planets, moons, galaxies, solar systems
Stars – size comparison starts work on standard form to build on work from maths lessons
Weight and gravity – simple equations and standard form
Speed – simple equations and standard form. Planning investigations
Particles – solids, liquids and gas

Year 7 Topic 5

Healthy living

Digestive system – structure and specialism
Food groups – investigations and impacts on digestive system and observational chemistry
Smoking – effects on the body (build on PHSRE)
Drugs and alcohol – effects on the body (build on PHSRE)
Exercise and heart rate – effects on the body. (build on PHSRE)

Year 8 Topic 1

Life under the microscope

Plant and animal cells – Introduction to cells before topics like respiration and photosynthesis. Some familiar language from prior topics
Stem cells - introductions to genetics
Specialised cells – use of microscopes and calculations of magnification
Organs and tissues – links year 7 to year 8

Year 8 Topic 3

Chemical reactions 1

Different types of reaction including, combustion. thermal decomposition and displacement reactions. Knowledge from y7 topic 4 essential. Numeracy around conservation of mass. Significant experimentation and safety. Looking at variables and statistical methods.

Year 8 Topic 5

Women in physics

Radiation – links energy and atoms together from y7 and 8
The electromagnetic spectrum – more detail on the waves transfer from topic 1
Standard form and prefixes – very large and small numbers. SI units and prefixes taught explicitly
Terminal velocity – links forces and speed from y7

Year 9 Topic 1

Energy on earth

Kinetic energy and GPE. Builds on energy with numerical and practical approaches. Rearranging multistep equations
Energy in homes – insulation, efficiency, particle theory
Renewable and nonrenewable - links to fossil fuels
Speed and acceleration – ties forces, energy and motion together

Year 9 Topic 3

Deadly animals

Skeletal system, muscles, Neurons and reflexes. Continuing to build on organ systems. Latin names for cultural capital. Forces, moments and biomechanics.

Year 9 Topic 5

Apple tarts and chocolate gateau

DNA – structure of DNA and location in the nucleus
Variation and inheritance – links genetics so evolution
Natural selection – add detail to y7 topic
Taxonomy – more complex taxonomy and genetic differences