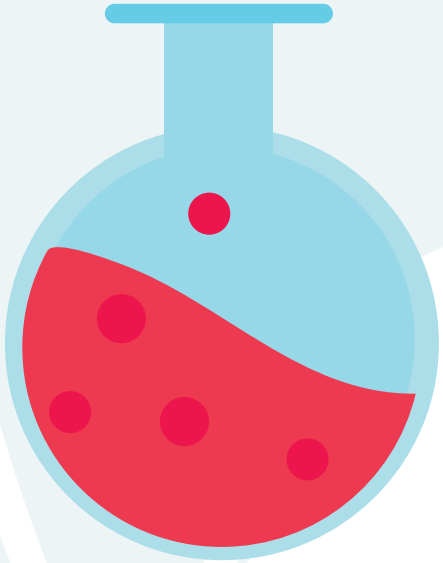
Harrow Way Community School

Learning for life, success for all



KS3 End Points

SCIENCE

Harrow Way Science Department

KS3 Science End Points – What Your Child Will Know and Be Able to Do

In Science, we build the core knowledge and thinking skills that students need to succeed at GCSE and beyond. We focus on learning that is:

- **Durable** – Students *remember* important knowledge over time.
- **In-depth** – Students *understand* it clearly, not just repeat it.
- **Flexible** – Students can *apply* their knowledge to new questions, places and problems.
  Each year builds on the one before. Below is a summary of what students should be able to do at the end of each year, alongside what they study. We use four levels:

Level	What it means
Platinum	Exceptional understanding with deep, flexible thinking. Can explain clearly and make insightful links.
Gold	Strong understanding with clear explanations and well-chosen examples. Applies knowledge with growing confidence.
Silver	Basic understanding, can describe ideas but needs support to explain or apply them.
Bronze	Early stage understanding, mostly factual recall with limited clarity. Needs frequent support.

Year 7 – Building Big Ideas:

What students study: Year 7 Science: Topics and Enquiry Questions

- **Cells and Organisation**

  Students learn what cells are, how microscopes are used, and how to prepare and compare slides. They explore unicellular organisms and how substances move in and out of cells. The topic ends with how cells combine to form tissues and organs, building the foundation for understanding biological organisation.
  Enquiry Question: *How do cells form systems that keep organisms alive?*

- **Respiration**

  Students recap cells and organ systems before studying breathing and the structure of the respiratory system. They learn how adaptations support gas exchange, investigate aerobic and anaerobic respiration (including practical energy tests), and examine how exercise affects respiration. The topic concludes with the impact of smoking and a review of how respiration supports life processes.
  Enquiry Question: *How does the body take in and use oxygen for life processes?*

- **Reproduction and Movement**

  Students study male and female reproductive anatomy and how fertilisation occurs. The topic then shifts to movement, covering the skeleton, muscles, joints, tissues and how muscle fatigue develops. It links reproduction (how new organisms begin) with movement (how organisms function and survive).
  Enquiry Question: *How do organisms reproduce and how does the body support movement?*

  Variation and Plants

  Students begin with variation in organisms before moving into plant biology. They study specialised plant cells, leaf adaptations, flower structure, pollination, fertilisation and seed dispersal. The topic ends with a review of how variation and plant reproduction contribute to survival and biodiversity.

  Enquiry Question: *How do organisms stay healthy and how do plants reproduce?*

- **Elements and the Periodic Table**

Students learn the foundational ideas of chemistry: atoms, elements and compounds. They explore how the periodic table is organised, including metals vs non-metals, groups, and how patterns in the table link to element properties. They study formulae, conservation of mass, metal oxides and how compounds form. This topic builds the core chemical language and structure needed for all later chemistry.
Enquiry Question: *How does the periodic table help us understand elements and compounds?*

- **Acids and Alkalis**

  Students learn what acids and alkalis are, how the pH scale works, and how to measure pH safely. They investigate neutralisation, carry out mini-titrations, and explore how metals react with acids. The topic includes real-world applications (e.g. indigestion) and develops practical skills in handling chemicals, observing reactions and interpreting results.

  Enquiry Question: *How do acids and alkalis interact and how can we control their reactions?*

- **Earth Structure**

  Students study the structure of the Earth and the properties of different rock types. They learn how igneous, metamorphic and sedimentary rocks form, investigate density, and explore the rock cycle. Fossils are introduced as evidence of past life and geological change. This topic builds understanding of Earth materials and long-term planetary processes.
  Enquiry Question: *How do rocks form, change, and record Earth's history?*

- **Forces**

  Students learn the fundamental types of forces and how they affect motion. They study resultant forces, friction, Hooke's Law, gravity, weight and mass. The topic builds core understanding of how forces interact, how objects stretch or compress, and how balanced/unbalanced forces change movement.

  Enquiry Question: *How do forces change the motion and shape of objects?*

- **Space**

  Students explore the night sky, the solar system and key concepts about celestial bodies. They learn how day and night occur, why seasons change, and how the Moon moves. The topic develops understanding of Earth's place in space and how observable patterns link to planetary motion.
  Enquiry Question: *How does Earth's place in space affect what we observe?*

- **Energy and Matter**

  Students study different energy stores and how energy is transferred in matter. They learn about efficiency, conduction, insulation, convection, radiation and work done. The topic builds understanding of how energy moves through systems and how materials affect transfer.
  Enquiry Question: *How is energy transferred and used in everyday systems?*

End points	Platinum	Gold	Silver	Bronze
Knowledge of Concepts	Makes clear links between ideas such as how particles explain states, how forces cause motion, and how organ systems keep us alive.	Explains key ideas accurately using examples from topics like cells, forces or energy.	Describes main ideas within each topic, e.g. what cells or particles are.	Recalls a few simple facts, e.g. “solids have particles close together.”
Understanding of Processes	Explains how and why processes happen, e.g. how diffusion moves substances or how heating changes particle movement.	Explains what happens in familiar processes such as dissolving or muscle contraction using key terms.	Describes what happens but not why, e.g. “ice melts when warm.”	Identifies that change happens without explaining it.
Applying Knowledge	Applies knowledge confidently to new contexts, e.g. predicting why pressure changes when temperature or volume change	Applies knowledge to guided examples like new force diagrams or energy transfers.	Applies knowledge in familiar class examples only.	Struggles to apply ideas beyond recall.
Using Evidence	Interprets data and observations to justify conclusions, e.g. linking graph patterns to reaction rate or movement speed.	Uses data to describe patterns, e.g. “as temperature increases, diffusion is faster.”	Spots simple trends in data but gives limited explanation.	States what data shows without linking to ideas.

Scientific Communication	Communicates ideas clearly using accurate vocabulary such as cell membrane, conduction and force.	Uses key terms to give short explanations, e.g. “energy is transferred as heat.”	Uses some scientific words but not always correctly.	Gives basic descriptions with limited scientific vocabulary.

□ Year 8 – Deepening Understanding:

What students study: *Year 8 Science: Topics and Enquiry Questions*

- **Interdependence**

  Students study how living things depend on each other and their environment. They learn how stomata work, how photosynthesis produces food for plants, and what healthy plant growth requires. They explore predator–prey relationships, how populations are measured, and how food chains and webs show energy flow. The topic ends with human influences on ecosystems.
  Enquiry Question: *How do organisms depend on each other and their environment?*

- **Nutrition**

  Students learn what a balanced diet is and how the digestive system breaks food down. They study enzymes and how they catalyse digestion, explore absorption in the small intestine, and examine the effects of unhealthy diets.
  Enquiry Question: *How does the body process food to stay healthy?*

- **Variation and Inheritance**

  Students begin with variation before learning about DNA, gender, biodiversity and evolution. They study adaptations and extinction, then explore selective breeding and genetic engineering. The topic builds understanding of how traits are inherited and how species change over time.
  Enquiry Question: *How do inherited and environmental factors shape organisms?*

- **Disease**

Students study microbes, barriers to infection, and how diseases are transmitted. They revisit microscopes, learn how the immune system fights infection, and explore antibiotics, vaccinations and the effects of drugs.
Enquiry Question: *How do diseases spread and how does the body defend itself?*

- **Mixtures**

Students recap elements and compounds, then learn the basics of atomic structure. They study pure vs impure substances, solutions, filtration, evaporation, distillation, crystallisation and **finish** with chromatography as the final separation technique.
Enquiry Question: *How can mixtures be separated and analysed?*

- **Reactions**

Students explore chemical and physical changes, write chemical equations, compare exothermic and endothermic reactions, and then study fuels, oxidation, combustion, displacement, catalysts and decomposition.
Enquiry Question: *How do chemical reactions create new substances and transfer energy?*

- **Environmental Science**

Students study the atmosphere, combustion, the greenhouse effect, global warming, finite and renewable resources, ceramics, polymers, the carbon cycle, metal extraction, reduction of ores and recycling.
Enquiry Question: *How are human activities affecting the Earth, and how can science help reduce this impact?*

- **Forces and Motion**

Students build on their Year 7 forces knowledge by applying it to motion and pressure. They learn how to calculate speed and interpret distance–time graphs. They study gas pressure, liquid pressure and pressure on solids, understanding how particles and force distribution explain these effects. The topic ends with turning forces (moments)
Enquiry Question: *How do forces and pressure affect the motion and behaviour of objects?*

- **Electricity and Magnetism**

Students study static electricity, circuit symbols, and how to measure current and voltage. They compare series and parallel circuits and investigate resistance. The topic then moves into magnetism: magnets, magnetic fields, electromagnets and DC motors. This builds a full understanding of how

electricity and magnetism interact to create movement and control systems.
Enquiry Question: *How do electricity and magnetism work together to create movement and power devices?*

- **Waves**

Students learn the properties of waves and how they transfer energy. They study reflection and refraction, then apply these ideas to the eye and colour. The topic continues with sound waves and how the ear detects them.
Enquiry Question: *How do waves help us to see, hear, and understand the world around us?*

End points	Platinum	Gold	Silver	Bronze
Knowledge of Concepts	Makes clear links between ideas such as how digestion and respiration release energy, how atoms form elements, and how forces create pressure.	Explains key ideas accurately using examples from topics like elements, energy transfer or health.	Describes main ideas within each topic, e.g. what atoms, enzymes or forces are.	Recalls a few simple facts, e.g. “metals are elements” or “energy can be transferred.”
Understanding of Processes	Explains how and why processes happen, e.g. how photosynthesis stores energy or how pressure changes in gases.	Explains familiar processes such as breathing or chemical reactions using key terms.	Describes what happens but not why, e.g. “plants make food in leaves.”	Identifies that change happens without explaining it.
Applying Knowledge	Applies knowledge confidently to new contexts, e.g. predicting how temperature affects reaction rate or how insulation reduces energy loss.	Applies knowledge to guided examples like new circuits or pressure problems.	Applies knowledge in familiar class examples only.	Struggles to apply ideas beyond recall.

Using Evidence	Interprets data and observations to justify conclusions, e.g. analysing graphs on enzyme activity or changes in gas volume.	Uses data to describe patterns, e.g. “increasing light increases the rate of photosynthesis.”	Spots simple trends in data but gives limited explanation.	States what data shows without linking to ideas.
Scientific Communication	Communicates ideas clearly using accurate vocabulary such as enzyme, pressure, element and current.	Uses key terms to give short explanations, e.g. “magnetic fields attract or repel.”	Uses some scientific words but not always correctly.	Gives basic descriptions with limited scientific vocabulary.

Year 9 – Complex Thinking:

What students study:

- *Biology – Cells, Organisation, Bioenergetics*
- *Chemistry – Atoms and the Periodic Table, Introduction to Bonding, Introduction to Quantitative Chemistry, Acids and Bases*
- *Physics – Energy, Electricity, Particles*

End points	Platinum	Gold	Silver	Bronze
Knowledge of Concepts	Makes clear links across biology, chemistry and physics, e.g. connecting energy changes in respiration with those in chemical reactions or electric circuits.	Explains key ideas accurately using examples such as cell structure, bonding, or energy transfer.	Describes main ideas within each topic, e.g. naming cell parts or types of bonds.	Recalls isolated facts, e.g. “metals form positive ions” or “energy is measured in joules.”
Understanding of Processes	Explains how and why processes happen using cause-and-effect reasoning, e.g. how enzymes control respiration.	Explains familiar processes such as photosynthesis, bonding or energy transfer using key terms correctly.	Describes what happens in processes like diffusion or melting but gives limited reasoning.	Identifies that change happens without explaining it.
Applying Knowledge	Applies knowledge confidently to new problems, e.g. predicting how a change in current affects resistance or changing the reactants will create different salts.	Applies knowledge to guided examples, such as rearranging equations with support.	Applies knowledge in familiar examples only.	Struggles to apply ideas beyond recall.

Using Evidence	Analyses data and graphs to justify conclusions, e.g. interpreting rate-of-reaction graphs or evaluating energy-change results.	Uses data to identify patterns, e.g. linking concentration to rate or voltage to current.	Describes simple trends but with limited explanation.	States what data shows without linking to ideas.
Scientific Communication	Communicates ideas clearly using accurate scientific language such as chloroplast, ionic bond, and resistance.	Uses key terms appropriately in short explanations.	Uses some scientific words but not always correctly.	Gives basic descriptions with limited scientific vocabulary.