SCIENCE KS3 CURRICULUM INTENT

It is the intention of the Science curriculum to provide opportunities for students to develop a love and an understanding of science. Through the spiralling of 'big ideas' starting in year 7 all the way through to year 9, students will gradually build on their knowledge of core science concepts, recallingprevious knowledge whilst extending with new contentacross the three years. Throughthe integration of practical activities and projects, studentswill gain vitalskills and understanding of core science concepts whilst allowing them to become true scientists, providing them the opportunity to question, researchand understand the world aroundthem.

ORMISTON FORGE ACADEMY

THRESHOLD CONCEPTS

TC1 Organisms - begin to understand the structure and functions of different organisms

TC2 Genetics - understand how our DNA codes for our variation and evolution

TC3 Ecosystems - begin to understand the structure of plants and their importance in ecosystems

TC4 Particles - develop a basic understanding the structure of the atom and how this links to different substances

TC5 Chemical Reactions – begin to understand what happens during different chemical reactions

TC6 Earth's Resources - understand the structure of the Earth and how this is being affected by humans

TC7 Matter - develop an understanding of the particle model and how this is fundamental to mixtures and reactions

TC8 Energy - begin to understand the energy stores and how this can translate different energy transfers

TC9 Forces - develop an understanding of basic forces and the effects they have on objects

TC10 Electricity and magnetism - understand the structure and function of magnets and electrical circuits

TC11 Waves - learn the basic types of waves and develop into understanding their properties and effects

SUPPORT AT HOME

- Exploring websites such as BBC Bitesize
- Reading about science developments on the news.
- Watching science documentaries, such as Planet Earth.
- Talk about the world around you.
- Encourage students to ask questions that are hard to answer.

ENRICHMENT

- Visits to universities
- STEM club
- Guest speakers
- Trips linked to STEM
- Documentaries in science lessons

PERSONAL DEVELOPMENT

It is the intention of the science department to nurture students with a curiosity of the world around them. Science students will learn to understand the workings of the universe and, more importantly, students will be encouraged to ask the right scientific questions when they don't understand things. Science not only allows us to understand where we come from, but also to shape the world we will inhabit in the future. Our learners will develop the skills which will enable them to investigate scientific phenomena and analyse their findings. Helping the next generation respect and understand their surroundings is the best way to create a future that benefits everyone.

CURRICULUM LINKS

- English → use of key terminology and definitions
- Mathematics → calculating means, drawing bar charts and line graphs, completing equation calculations
- History → looking at the timeline of scientific discoveries and theories
- Geography → understanding ecology, volcanoes and global warming
- PE → understanding the human body and exercise

CAREERS

- Teaching
- Nursing/ Midwife/ Doctor/ Surgeon / Pharmacist / Optometrist / Dentist
- Engineer (chemical, mechanical, energy, nuclear)
- Environmental scientist / Science researcher
- Forensic scientist / Pathologist / Microbiologist
- Biochemists
- Biotechnology
- Astronomer

SCIENCE YEAR 7

AUTUMN

TERM 1

THRESHOLD CONCEPTS : 1, 4, 7 and 8.

ORMISTON FORGE ACADEMY

WHAT

Students will:

- Learn key science equipment and safety in the science lab to carefully plan and carry out investigations.
- Understand the structure of the atom and the different properties of elements, compounds and mixtures.
- Learn the properties of solids, liquids and gases and describe the changes of state.
- Explore how multicellular and unicellular organisms are composed to carry out life processes.
- Understand the different stores of energy and how energy can be transferred.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

Mean, continuous variable, categoric variable, bar chart, independent variable, dependent variable, control variable, hypothesis, risk, hazard.
Atom, Dalton mode, element, molecule, compound, periodic table, chemical reaction, chemical symbol, chemical formula.
State of matter, property, particle theory, chemical change, physical change, melting, freezing, boiling, evaporating, condensing, sublimation.
Organism, cell, unicellular, multicellular, tissue, organ, organ system, diffusion, magnification resolution.
Conservation of energy, joule, gravitational potential energy store, kinetic energy store, elastic potential energy store, chemical energy store, thermal energy store, magnetic energy store, electrostatic energy store, energy transferred, dissipation.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.

SCIENCE YEAR 7 SPRING TERM 2

THRESHOLD CONCEPTS : 2, 5 and 9

ORMISTON FORGE ACADEMY

WHAT

Students will:

- -Learn how chemicals can be categorised as acids and alkalis using indicators to correctly identify them.
- Explore the structure of the male and female reproductive systems and how sperm and egg cells fuse together.
- Understand what a contact and non-contact force is and explore how forces can affect moving objects.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

pH scale, acid, alkali, indicator, neutralization, base, concentration. Gamete, testes, ovary, menstruation, ovulation, fertilization, gestation, foetus, placenta, amniotic fluid, umbilical cord.

Forces, newtons, contact forces, non-contact forces, speed, relative motion, distance-time graph, friction, drag, resultant force.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.

SCIENCE YEAR 7

SUMMER

TERM 3

THRESHOLD CONCEPTS : 3, 6, 10 and 11

ORMISTON FORGE ACADEMY

WHAT

Students will:

- Understand what static electricity is and how positive and negative charges can be generated and used.
- Explore the origins and structure of the periodic table to understand key properties of different groups and elements in the table.
- Learn how plants are structured and how they sexually reproduce to produce seeds
- Explore sound waves and how they travel so that we can hear things around us.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

Electric field, negatively charged, positively charged, electrons, charged up, electrostatic force, current, attract, repel. Periodic table, element, groups, periods, physical properties, chemical properties, group 1, group 7, group 0.

Stamen, carpel, ovule, anther, pollen, pollination, fertilisation, seed, fruit, germination.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.

SCIENCE YEAR 8

AUTUMN

TERM 1

THRESHOLD CONCEPTS : 1, 4, 7 and 8.

ORMISTON FORGE ACADEMY

WHAT

Students will:

- Develop key science skills learning to collect and interpret accurate data by carefully planning and carrying out investigations.
- Interpret changes of state and understand the changes in particle arrangement.
- Understand the energy changes of particles during heating and cooling.
- Explore the key organs of the human skeleton and the respiratory system and understand how they can work together.
- Understand what thermal energy is and begin to explore how thermal energy can be transferred.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

Mean, outlier, accurate, precise, bar chart, line graph, independent variable, dependent variable, control variable, hypothesis, repeatable, reproducible.
States of matter, property, particle theory, chemical change, physical change, volume, density, compressibility, the Law of Conservation of Mass.
Particle, temperature, melting point, boiling point, heating curve, cooling curve, density, volume, expands, contracts.
Joint, bone marrow, ligaments, tendons, cartilage, antagonistic muscle pair, trachea, alveoli, gas exchange, lung volume, capillaries.
Thermal energy store, kinetic energy store, thermal equilibrium, heat, temperature, conduction, conductor, insulator, convection, radiation.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.

SCIENCE YEAR 8 SPRING TERM 2

THRESHOLD CONCEPTS : 2, 5 and 9.

ORMISTON FORGE ACADEMY

WHAT

Students will:

- Learn how elements can be placed into an order based on their reactivity, exploring how they react. with other elements
- Explore how there is variation between individuals and begin to link this to the structure of DNA.
- Understand what pressure is and how we can calculate pressure, before exploring the effects of pressure in fluids.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

Element, metals, non-metals, oxidation, reactivity, natural resources, extraction, ore, polymer, ceramics, composites.
Species, variation, continuous variation, categoric variation, DNA, chromosomes, gene, inherited characteristic, environmental characteristics, heredity, selective breeding.
Fluid, pressure, upthrust, atmospheric pressure, volume, density, depth.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.

SCIENCE YEAR 8

SUMMER TERM 3

THRESHOLD CONCEPTS : 3, 6, 10 and 11.

ORMISTON FORGE ACADEMY

WHAT

Students will:

- Explore the different components used in simple circuits and learn how to build series and parallel circuits.
- Explore the structure of planet Earth, learning the different types of rock and the processes that have happened over. millions of years
- Learn about the structure of ecosystems and how different organisms rely on each other for their survival.
- Explore light waves and how they travel so that we can see things around us.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

Current, potential difference, ammeter, voltmeter, crocodile clip, resistor, series circuit, parallel circuit, conductor, insulator.
Minerals, tectonic plates, rock cycle, weathering, erosion, sedimentary rock, igneous rock, metamorphic rock, strata.
Ecosystem, environment, population, food web, food chain, producer, consumer, decomposer, interdependence, biodiversity.
Transverse wave, amplitude, wavelength, frequency, waves, transmission, absorption, scattering, transparent, translucent, opaque.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.

SCIENCE YEAR 9

AUTUMN

TERM 1

THRESHOLD CONCEPTS : 1, 2, 4, 5, 7 and 8.

ORMISTON FORGE ACADEMY

WHAT

Students will:

- Develop key science skills, learning to collect and interpret data and beginning to evaluate and suggest improvements to improve accuracy and validity.
- Learn the difference between mixtures and pure substances and link this to exploring different methods of separating mixtures.
- Explore the structure of the universe and understand the importance of the Sun in keeping us alive.
- Understand the organs that make up the digestive system and understand how they work together so that we can break down the food we eat.
- Explore how electricity is generated and how much it costs based on the usage over time.
- Explore different types of reactions and understand how energy levels in reactions change.
- Learn how organisms are adapted to increase their chances of survival, learning to change and evolve over time.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

Outlier, accurate, precise, random error, systematic error, independent variable, dependent variable, control variable, repeatable, reproducible, peer review.

Solvent, solute, dissolve, solution, pure substance, mixture, filtration, distillation, evaporation, chromatography.

Orbit, galaxy, universe, solar system, exoplanet, asteroid, comet, star, weight, mass, gravitational field strength.

Digestion, stomach, small intestine, large intestine, bacteria, enzymes, carbohydrates, protein, lipids, deficiency.

Energy resource, non-renewable resource, renewable resource, power, efficiency, watts, kilowatt hour, joules.

Reactivity, chemical reaction, chemical bond, reactants, products, the Law of Conservation of Mass, catalysts, fuel, thermal decomposition, oxidation, displacement, exothermic reaction, endothermic reaction.

Species, variation, adaptation, population, natural selection, competition, evolution, extinction.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.

SCIENCE YEAR 9 SPRING TERM 2

THRESHOLD CONCEPTS : 3, 6, 9, 10 and 11.

ORMISTON FORGE ACADEMY

WHAT

Students will:

- Explore different examples of forces and how items like springs are used in simple machines.
- Explore what a magnet is and how magnetic objects can be linked to electricity.
- Understand the human causes of global warming and how we can reduce the effects through recycling.
- Explore the chemical reaction of respiration to understand how energy is released for our muscles to contract.
- Explore the chemical reaction of photosynthesis in plants to understand how light energy is used to produce glucose.
- Understand the importance of lights interactions with different objects and how this can affect the travel of light waves.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

Elastic potential energy store, directly proportional, Hooke's Law, deformation, compression, tension, moment, pivot, equilibrium, simple machines, effort, load.
Permanent magnet, induced magnet, magnetic materials, magnetic fields, magnetic poles, compass, electromagnet, solenoid, core, DC motor.
Natural resources, greenhouse effect, global warming, fossil fuels, carbon sink, recycling.
Mitochondria, aerobic respiration, anaerobic respiration, lactic acid, fermentation, ethanol.
Leaf, palisade cell, chlorophyll, chloroplast, stomata, photosynthesis, cellulose, producer, starch.
Incident ray, reflected ray, normal line, angle of reflection, angle of incidence, refraction, absorption, scattering, convex lens, concave lens, retina.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.

SCIENCE YEAR 9

SUMMER TERM 3

THRESHOLD CONCEPTS : 1, 4 and 7.

ORMISTON FORGE ACADEMY

WHAT

Students will:

- Further explore and develop in depth core knowledge of the structure of eukaryotic and prokaryotic cells and how substances are transported.
- Further explore and develop in depth core knowledge of the structure of the atom and periodic table.
- Further explore and develop in depth core knowledge of the particle arrangement in solids, liquids and gases and the changes in the energy stores of particles.

WHY

In order to:

- Learn core scientific terminology and understand what it means.
- Begin to question their understanding and ask questions to challenge their understanding.
- Share their own views and opinions and be respectful of other peoples view and opinions.
- Develop new practical skills through experiments and learn how to analyse and interpret data.
- Be exposed to new knowledge and develop a better understanding and appreciation for everything scientific.

HOW

ASSESSMENT

Students will be assessed through:

- Whole class feedback and DM tasks.
- Verbal feedback in lessons.
- Deep learning. homework projects and homework quizzes.
- End of topic pop tests to assess recall and understanding.
- Two science assessments throughout the year to assess recall of current learning at that point in time.

VOCABULARY

Prokaryotic cell, eukaryotic cell, diffusion, osmosis, active transport, differentiation, stem cell, mitosis, magnification, resolution. Element, isotope, compound, mixture, chromatography, filtration, crystallisation, distillation, fractional distillation, displacement. Particle model, density, mass, volume, internal energy, temperature, specific heat capacity, specific latent heat, gas pressure.

READING SKILLS

Students will fill in their science booklet throughout the topics developing their learning of key terminology and scientific definitions.

Students will develop their reading skills through tasks: skimming and answering questions, following a scientific method, interpreting data and plotting data and information gathering.