Holy Trinity Progression Map of Key Concepts for Science – Key Stage 4 Physics

Physics unit 3 revision scheme
How do we calculate density
What is internal energy
How do we calculate specific heat capacity?

Physics unit 2 revision scheme Electricity
How are current, potential difference and resistance linked?
How does the length of a wire affect resistance and which other factors affect it?
What are ohmic and non ohmic resistors?
What is power and how do we calculate it?
TRIPLE ONLY
How is static electricity created and what are the problems with it?
What is an electrical field?

Physics unit 8 Space
TRIPLE ONLY
What is in our solar system?
How are stars born and what happens in their life cycle?
What is the difference between artificial and natural satellites?
What are the uses of satellites?
How did the universe begin and what evidence tells us about this?

Physics unit 1 revision scheme
What are the different stores of energy?
What pathways account for the transfer of energy?
What impact do different energy sources have on the environment?

Physics unit 7 Magnetism and electromagnetism
What are the ends of magnets called and what do we use magnets for?
What shape are magnetic fields and how do we investigate them?
What are electromagnets, how can we change their strength and what are their uses?
What is Flemings left hand rule?
What is the motor effect and how do we use it?
TRIPLE ONLY
How do loudspeakers work?
What is electromagnetic induction?
What is the generator effect and how do we use it?
How do microphones work?
What are transformers and how are they used in the national grid?

Physics unit 6 Waves
What are the features and properties of a wave?
How do we calculate wave speed?
What is the electromagnetic spectrum and what are the properties and applications of each part?
What is reflection and refraction?
How do we measure reflection and refraction?
TRIPLE ONLY
What happens when waves pass through different shaped lenses?
What is black body radiation and how an we measure it?
How do we hear sounds?
How can we use ultrasound to explore?
How can we investigate seismic waves?

11 Physics

11 Physics

Physics unit 5 Forces
What are examples of contact and non contact forces?
How do we draw force diagrams to represent vectors?
How are weight and gravity related?
How does mass affect the length of a spring and how can we investigate this?
How can we calculate work done and energy transfers?
What is acceleration and how can we represent it graphically?
What are Newtons Laws and give examples
How do we calculate stopping distance and what factors affect it?
TRIPLE ONLY
How do moments, gears and levers work?
What is momentum and how do we calculate it?
How is pressure produced?

Physics unit 4 Atomic structure
What is an atom made of and how has our idea of the atomic model changed?
What are the types of radiation and how does decay occur?
How is half life of radioactive material calculated?
How do we become contaminated with radiation?
TRIPLE ONLY
What are the sources of background radiation?
What are the medical uses of radiation?
What is the difference between nuclear fission and fusion?

Physics unit 3 Particle model of matter
What does density mean and how do we calculate density of regular solids, irregular solids and liquids?
What happens when substances changes state?
What is internal energy and how do we calculate it?
What is specific heat capacity and how do we calculate it?
What is specific latent heat and how do we calculate it?
TRIPLE ONLY
How is gas pressure created and affected?

Physics unit 2 Electricity
What is current and how is it different in series and parallel circuits?
How are current, potential difference and resistance linked?
How does the length of a wire affect resistance and which other factors affect it?
What are ohmic and non ohmic resistors?
How do we create and distribute mains electricity safely in the national grid?
What is power and how do we calculate it?
TRIPLE ONLY
How is static electricity created and what are the problems with it?
What is an electrical field?

10 Physics

Holy Trinity Progression Map of Key Concepts for Science – Key Stage 4 Chemistry

Chemistry unit 5 revision scheme
What are reaction profiles?
How do we decide if a reaction is endothermic or exothermic?

Chemistry Unit 3 revision scheme
How do we balance equations?
How do we calculate formula mass?

Chemistry Unit 4 revision scheme
What is electrolysis?
How do we decide on the order of reactivity of metals?

Chemistry Unit 2 revision scheme
How does Ionic and covalent bonding happen?
What are the properties of Ionic and covalent compounds?

Chemistry unit 10 Using resources
What are useful resources from the earth?
What is potable water and how do we produce it?
How can we analyse water samples?
How can we reduce the resources we use so we are more sustainable?
What are alternative ways to extract metals?
TRIPLE ONLY
How do we prevent corrosion?
What are alloys and how are they useful?
What are the uses of ceramics, polymers and composites?
What is the Haber process and why is it useful?
How do we prepare fertilisers in the Laboratory?

Chemistry Unit 1 revision scheme
Describe the difference between atoms, elements and compounds
What is the structure of an atom
How is the periodic table arranged

Chemistry unit 8 Chemical analysis
What is a formulation and what are examples?
How do we carry out chromatography?
How do we test for gases?
TRIPLE ONLY
How do we test for positive and negative ions?
What i/s flame emission spectroscopy and why is it useful?

Chemistry unit 9 Chemistry of the atmosphere
How did the atmosphere evolve?
How has the climate changed over time and why did this happen?
How can we reduce our carbon footprint?
What are common sources of atmospheric pollutants?

11
Chemistry
Science

11
Chemistry
Science

Chemistry unit 7 Organic chemistry
How do we obtain crude oil and what are it's uses?
What is fractional distillation and why is it useful?
What are the properties of the different hydrocarbons?
What is cracking and what are alkenes?
TRIPLE ONLY
What is the structure and uses of Alkenes?
What are the uses of Alcohols and how do they react?
How do we form addition and condensation polymers?
What are Biological polymers

Chemistry unit 6 The rate and extent of chemical change
How do concentration, surface area, temperature and catalysts affect rates of reaction?
How do we use Le chateliers principle to explain equilibrium?

Chemistry unit 4 Chemical changes
How are metal oxides formed?
How can we order metals in the reactivity series?
How do we use the blast furnace to extract metals?
How can we explain electrolysis in terms of oxidation and reduction?
How do metals react together?
How are soluble salts formed?
How does electrolysis purify metals?
TRIPLE ONLY
How do we carry out titrations?

Chemistry unit 5 Energy changes
What's the difference between endothermic and exothermic reactions
How do we draw reaction profiles?
What happens when bonds are created and broken?
TRIPLE ONLY
How do we make batteries?
How do we make fuel cells and what are their uses?

Chemistry unit 3 Quantitative chemistry
How do we write chemical equations, including balancing equations?
How do we calculate relative formula mass and what is conservation of mass?
How can we use the idea of a mole to calculate yields?
TRIPLE ONLY
How do we calculate percentage yield?
How do we calculate concentration of solutions?
How does the mole relate to the amount of matter when gases are at standard temperature and pressure?

10
Chemistry

Chemistry unit 2 Bonding
What are the three states of matter?
How does Ionic bonding happen and what are the properties of Ionic compounds?
How does covalent bonding happen and what are the properties of covalent compounds?
What are the types and uses of carbon allotropes?
How do metals form bonds?
TRIPLE ONLY
How do we measure really small particles?
What are the uses of nanoparticles?

Holy Trinity Progression Map of Key Concepts for Science – Key Stage 4 Biology

Biology unit 7 revision scheme
What is variation?
How can we investigate the distribution of plants in the environment?
How is organic material recycled?
What do organisms compete for?

Biology unit 4 revision scheme
What factors affect the rate of photosynthesis?
How do animals get the energy they need?

Biology unit 3 revision scheme
How does the body defend itself against disease?
What are the four types of pathogen?
How do vaccinations work?

Biology unit 1 Revision scheme
What is inside a cell?
How do we use a microscope?
What is diffusion, osmosis and active transport?

Biology unit 2 revision scheme
How is the body organised?
How does the digestive system work?
How does the circulatory system work?

Biology unit 7
What are biotic and abiotic factors?
How are organisms adapted for survival?
What are food chains and webs and what factors can affect them?
What is the impact of humans lifestyle on the planet?
What causes global warming and how can we slow it down?
How do we sample our environment to find out what lives in different habitats?
TRIPLE ONLY
How does energy pass through the ecosystem?
Which factors affect decay?
How can we ensure the future of fishing in a sustainable manner?
How can we use Biotechnology to help with food shortages?

11
Biology

Biology unit 6 Inheritance, variation and evolution
What is the structure of DNA?
Why do we screen for genetic diseases and examples of genetic diseases
How does genetic inheritance for sex and other characteristics happen?
How does natural selection lead to evolution and what gives us evidence of evolution (fossils)
TRIPLE ONLY
How are proteins synthesed?
How do we clone plant and animals?
What is speciation?

11
Biology

Biology unit 5 Homeostasis
How does our body control internal conditions?
How do the nervous system and hormonal system communicate with other parts of the body?
What are the different types of contraception?
What is diabetes and how do we treat it?
TRIPLE ONLY
How do the kidneys work?
How do the brain and eye work?
What are the role of different hormones in plants?

Biology Unit 4 Bioenergetics
How do plants get their energy?
What environmental factors affect plants?
How do plants use glucose?
How do animals get their energy?

Biology Unit 3 Infection and response
Why do we get ill?
How does our body protect us against illness?
What types of drugs do we take when we are ill?
TRIPLE ONLY
How do monoclonal antibodies help us?
How do plants protect themselves against disease?

Biology Unit 2 Organisation
How is the body organised?
How does the digestive system work?
How does the circulatory system work**?**
How are plants organised?

10
Biology

Physics Unit 1 Energy stores and resources
What are the different stores of energy?
What pathways account for the transfer of energy?
What impact do different energy sources have on the environment?
TRIPLE ONLY
How can we prevent energy loss?

Chemistry Unit 1 Atoms and the Periodic table
What are atoms, elements, compounds and mixtures?
What is the structure of an atom?
How is the periodic table arranged?
TRIPLE ONLY
What are the transition metals used for?

Biology Unit 1 Cells and microscopes
What's inside a cell?
What are specialised cells?
How can we see microscopic cells?
How do things move round in and out of cells?
TRIPLE ONLY
How do we grow microorganisms?

9
GCSE

Electricity
What causes current to flow round a circuit?
How does resistance, current and potential difference change in series and parallel circuits?

Speeding up
How do we represent forces on graphs?
How are acceleration and velocity different?

Inheritance
How are characteristics passed on?
Why do organisms evolve?
How do organisms interact in the environment?
Who discovered evolution?

9

17. Waves
What are the different types of wave?
What are the features of waves?

16. Metals and metal compounds
What are the properties of metals and non metals?

15. Microbes and disease
Why do we get ill?
How does our body protect us against disease?

13. Magnets
Which materials are magnetic?
What are the uses of electromagnets?

14. Heating and cooling
What are the states of matter?
What is the difference between heat and temperature?

12. Bioenergetics
How do we get energy from food?
How do plants get energy?

11. Pattern in reactivity
What is the Periodic table?
How do different groups in the periodic table react?

8

10. Food and digestion
Which organs are in the digestive system**?**
What is a balanced diet?

9. Variation
What is a habitat?
How can we find out what's living in a habitat?
What is a food chain?

8. Forces
How do forces affect objects?
How do we represent forces in diagrams?

7. Particles
How do we represent solids, liquids and gas particles?
How do we separate substances?

5. Acids and alkalis
What is an acid and an alkali?
How can we test the strength of acids and alkalis?

6. Energy transfer and efficiency
What is energy and how is it transferred?

4. Atoms, elements and compounds
What is an element and a compound?
How can we tell a chemical reaction is happening?

2. Human reproduction
What is the function of the reproductive system?
How does the menstrual cycle happen?
What are the stages of pregnancy?

3. Solar system
Why do we have seasons?
Why do we have day and night?
What is in our solar system?
What are the phases of the moon?

1. Cells, tissues and organs
How are living things organised?

7

4. Evolution and inheritance
Children will learn about traits that are passed from one generation by the next, and consider ways in which in which some inherited characteristics may vary.

5. Healthy Bodies
Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.

3. Classifying organisms
How can we classify animals?

2. Changing circuits
Children will find differences between series and parallel circuits.
Children will suggest ways in which changing circuits could affect the brightness of a bulb or the speed of a motor.

1. Seeing light
Children will learn about the anatomy of the eye.
Children will learn about the laws of reflections.

6

4. Properties and change of materials
What reversible and irreversible changes are caused by heating or cooling materials?
Exploring substances through mixing, filtering, evaporation and sieving.

5. Animals including humans
How does the human body change?
Children will learn about, then order, the main stages in the life cycle of humans.

3. Earth and space
Children will learn about the celestial bodies of the Sun, Moon and Earth and how they are related to one another.

2. Life cycles
Children will learn about sexual reproduction in animals, including some ways in which some reptiles and fish reproduce.
Children will study and compare the life cycles of animals living in a variety of environments.

1. Forces in action
What is resistance?
The children will learn about how forces are affected by different types of resistance.

5

5. Circuits and conductors
What are the main components?
To explore ways in which simple circuits are constructed.

4. Living in environments
What are habitats and consider why their conditions are important for the animals living in them?
To consider ways in which animals living in environments are affected by human behaviour, then suggest ways in which we can help protect and sustain habitats.

3. Eating and digestion

1. Changing sound
How is sound created?
How does it travel through a variety of different objects?
What is pitch and how can it be altered?

2. States of matter
What are solids, liquids and gases?
How are they used in everyday life?
Examine the particles in solids, liquids and gases and how they behave in these states.
Explore the four simplified steps of the water cycle.

4

5. Light and shadow
What is light? What is darkness?
What is a shadow and how is it created?

4. Magnets and forces
What is a force and how can it be measured?
What is a magnet?
To test a variety of objects to see if they are magnetic.

3. How plants grow
How do plants make their own food?
How does pollination occur?
What is the structure of a seed and how does this help them grow?

3

1. Health and movement
How does the body move?
What are the functions of a skeleton?
What is the importance of a balanced diet?

2. Rocks and Fossils
Where do rocks come from?
What is erosion?
To categorise rocks between naturally occurring and man made objects similar to rocks.
What is a fossil and how is it formed?
What can we learn about animals from fossils?

5. Super Scientists

4. Growing plants
What is germination?
To devise tests to determine the various conditions seeds need to germinate.
To find out why plants grow well at certain times of years.

3. Exploring everyday materials
What are the differences between man made and natural objects?
How are materials made in objects?
How do materials move according to their properties?

2. Growth and survival- animals
What do animals need to grow?
Importance or health and exercise on our bodies.

1. Living in Habitats
What is a habitat?
To identify some life processes which indicate that animals and plants are alive.
To understand the features of different habitats and know why animals live there.

4. Identifying animals
What are the differences and between animals?
To understand the different classifications of animals.
To understand that animals can be grouped according to what they eat.

2

5. Identifying plants.
What are the main parts of plants and what do they need to grow?
To name and group a variety of different plants.

3. Seasonal changes
What are the different weather types and seasons?
To measure weather and perform simple tests.
To consider ways in which the changing conditions of the seasons affect the lives of animals, focussing on the behaviour of robins during each season.

1

2. My body
What are senses and what are they used for?
What are our different body parts used for?

1. Everyday Materials
What are common materials and their properties?
Why do the properties of materials make them suitable for certain uses?