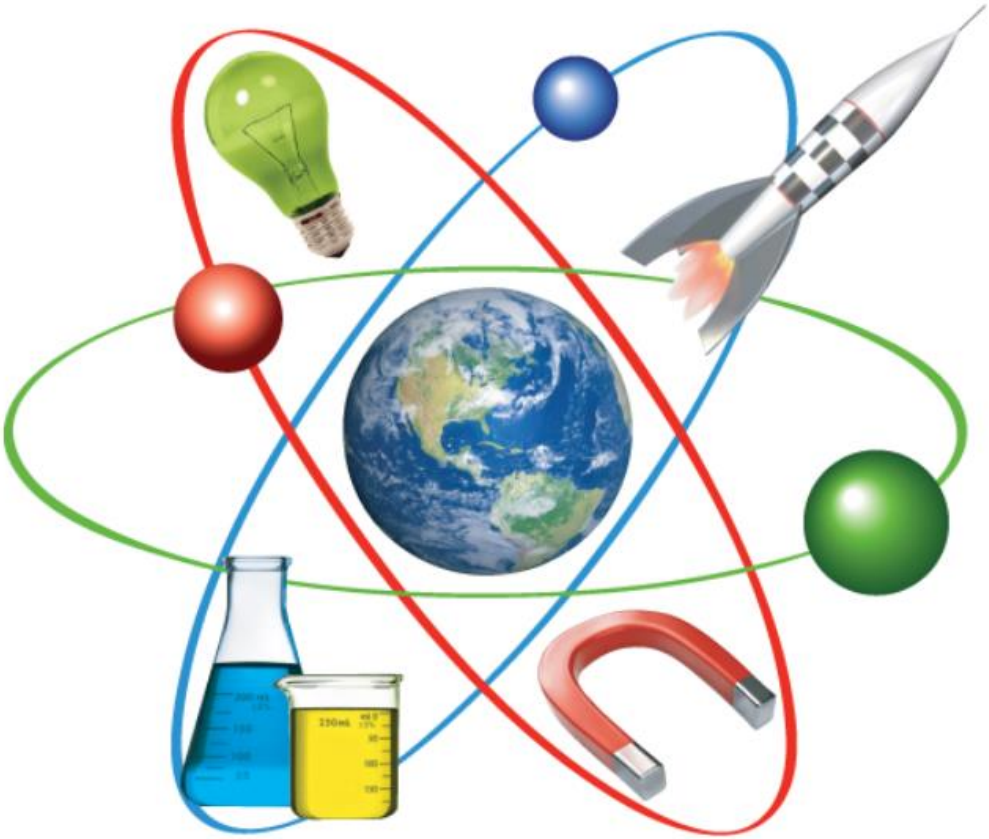
Science at Copperfield

Temperature
Seasons
Materials
Smell
Properties
Germination
Absorbent
Flexible
Firm
Reflective
Translucent
Transparent
Life cycle
Invertebrate
Food chain
Permeable
Igneous
Magnetic
Attract
Repel
Pollination
Glare
Beam
Light
Habitat
Shiny



Subject Leadership

CONTENTS

Subject Leaders at Copperfield

- Subject Leaders provide professional leadership for a subject or group of subjects to secure high-quality first teaching, a rich curriculum and the effective use of resources. The success of this will be measured by the impact on learning and progress for pupils.
- We do not expect Subject Leaders to be an 'expert' in the subject they lead. What is important is that they have the overview of what is going well and what needs to be improved – based on evidence.
- Subject leaders at Copperfield are part of both the Middle Leadership and the Copperfield Extended Leadership Teams
- Each Subject Leader has an assigned Mentor (from SLT)

All Subject Leaders will

- Be part of our distributed leadership
- Utilise the expertise, passion, pedagogical awareness and strengths of other leadership team members
- Establish a collective responsibility for demonstrating that everyone makes a difference
- Moving the school forward through driving the implementation aspect of each subject
- Professionally develop themselves and other staff team members
- Raise standards across all aspects of the curriculum
- Enrich the curriculum
- Share knowledge, expertise, skill, passion and enthusiasm

How does the role of Subject Leader fit into Copperfield's Ofsted Statement of Action?

The staff, pupils and school community are working on areas identified in the May 2021 Ofsted inspection.

'Leaders are developing their plans to ensure that all areas of the curriculum are equally ambitious and well sequenced. Currently, they are focusing on science and history. Leaders should review existing wider curriculum planning to ensure that essential knowledge is explicitly identified and sequentially mapped out from Nursery to Year 6. For this reason, the transition arrangement has been applied in this case'.

This handbook, along with every other handbook, maps out the sequential curricular links from Nursery to Year 6.

Our Curriculum Statement

Copperfield has an ambitious and aspirational curriculum designed to meet each individual's needs and to give all learners the knowledge and cultural capital they need to succeed in life. Strong teachers have been appointed to key posts within the school. They are aware of national curriculum developments, and pedagogical developments, and a range of strategies are implemented to improve practice, and to better meet the needs of pupils more effectively'

Our Four Drivers, making a well sequenced and ambitious curriculum.

Ethical, informed Individuals.

At Copperfield we aim to build confident, open-minded individuals who feel safe and secure within a caring environment based on mutual respect where everyone is valued and is able to maximise their individual potential. Children from our community may need to develop their self-esteem, confidence and communication skills. An example of this is our comprehensive PSHE curriculum, weekly Values Assembly, and expansive Wellbeing Programme, which all support with self-esteem, independence, perseverance and self-discipline. Our curriculum will also prepare our children to successfully engage with the wider community, as we educate the children on inclusivity and British values. Our 'hands-on' approach to learning in all areas of the curriculum will ensure the children have many opportunities to practice the traits and values they are learning on a daily basis.

Ambitious Capable Learners (Skills and Knowledge).

Our aim is to make learning exciting, enjoyable, relevant and appropriately challenging to build upon what learners already know. Reading is at the heart of our curriculum, it is central to all that we do. Children will read and enjoy a range of books from a myriad of genres. Enriching the children's vocabulary, knowledge and imagination. We also aim for every child to become confident and competent mathematicians, achievable through our maths mastery approach. Beyond the core subjects, the children's knowledge and awareness of how the wider curriculum, such as the arts, humanities, and sports, can be applied in, and have an impact on, their community will be explored. The children will be able to recite key facts and demonstrate their learning of news skills through various forms of outcomes.

Experiences to Inspire

Aware that children seldom explore beyond their very immediate community, our curriculum is designed to broaden the children's horizon. To inspire. The curriculum will be brought alive through hands-on experiences designed to teach and link new skills and knowledge to prior learning. Where possible, the learning will happen beyond the classroom, either on the school grounds, local community or beyond. To enhance their learning for each topic, the children will meet knowledgeable and engaging individuals (virtually or physically) whilst also immerse themselves in the worlds of craft, art, food and sport – taking the learning of skills and knowledge beyond textbooks and into real life experiences. Reach2's 11b411 has also been embedded into our curriculum, to help enrich the children's learning even further.

Successful in Society

Mindful that some challenges in the local community could have an impact on the children's learning and progress, the school continues to be an outward looking school. Through using the curriculum and resources at our disposal, we openly encourage the parents to engage with, and learn from, the children's curriculum and thus better place them to progress and prosper along with their children. Termly invitations to curriculum days, parent & teacher curriculum conferences and parent workshops with keynote speakers all come together as a package of support, upskilling and development for parents. This level of support for the support network is designed to elevate the standing of education, increase parental engagement and drive progress in the community. Running throughout the curriculum are our values we embed the 6 values in everything we do.

Aligning INTENT, IMPLEMENTATION AND IMPACT to ensure we meet the criteria for a good quality of education in the Education Inspection Framework

INTENT

Our curriculum is:

- deliberately ambitious
- designed to give all learners, particularly the most disadvantaged and SEND or high needs, the knowledge and cultural capital they need to succeed in life
- coherently planned and sequenced towards cumulatively sufficient knowledge and skills for future learning and employment
- broad and balanced , and allows all pupils access to the full range of subjects, throughout all years, from Nursery to Year 6
- successfully adapted to meet the needs of all learners, especially those with SEND, to develop their knowledge, skills and abilities to apply what they know and can do with increasing fluency and independence

IMPLEMENTATION

1. Teachers have good subject knowledge of the subject(s) they teach, and leaders support those teaching outside their main areas of expertise
2. Teachers:
    - present subject matter clearly, promoting appropriate discussion about the subject matter they are teaching
    - check learners' understanding systematically
    - identify misconceptions accurately
    - provide clear, direct feedback
    - respond, and adapt their teaching as necessary
3. Teaching is designed to help learners to remember in the long-term the content they have been taught, and to integrate new knowledge into larger concepts
4. Teachers and Leaders:
    - use assessment well to help learners embed and use knowledge fluently, or to check understanding and inform teaching
    - understand the limitations of assessment, and do not use it in a way that creates unnecessary burdens for staff and learners
5. Teachers create an environment that focuses on pupils:
    - textbooks and other teaching materials that teachers select – in a way that does not create unnecessary workload for staff – reflect the school's ambitious intentions for the course of study
    - materials clearly support the intent of a coherently planned curriculum, sequenced towards cumulatively sufficient knowledge and skills for future learning and employment
6. Work given to pupils is demanding and matches the aims of the curriculum in being coherently planned and sequenced towards cumulatively sufficient knowledge
7. Reading is prioritised to allow pupils to access the full curriculum offer
8. A rigorous and sequential approach to the reading curriculum develops pupils' fluency, confidence and enjoyment in reading:
    - At all stages, reading attainment is assessed and gaps are addressed quickly and effectively for all pupils

- Reading books connect closely to the phonics knowledge pupils are taught when they are learning to read

9. The sharp focus on ensuring that younger children gain phonics knowledge and language comprehension necessary to read, and the skills to communicate, gives them the foundations for future learning
10. Teachers ensure that their own speaking, listening, writing and reading of English support pupils in developing their language and vocabulary well

IMPACT

1. Pupils develop detailed knowledge and skills across the curriculum, and as a result achieve well. This is reflected in results from national tests
2. Pupils are ready for the next stage of education:
    - they have the knowledge and skills they need to go on to destinations that meet their interests and aspirations, and the course of study
    - those with SEND achieve the best possible outcomes
3. Pupils' work across the curriculum is of good quality
4. *Pupils:*
    - *read widely and often, with fluency and comprehension appropriate to their age*
    - *apply mathematical knowledge, concepts and procedures, appropriately for their age*

The Copperfield Way

Science

Intent:

Science teaching at Copperfield aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and application of Science – today and for the future.

All children are encouraged to develop and use a range of skills including observations, planning and investigation. They will be encouraged to question the world around them and become independent learners in exploring possible answers for the scientific based questions. Specialist vocabulary will be taught and built upon, with effective questioning to communicate ideas, being encouraged. Concepts taught are reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

Knowledge of scientific processes is gained throughout the child's journey through school. Learning in Key Stage Two builds on prior learning in Key Stage One, which in turn builds on the solid foundations gained in the Early Years Foundation Stage. Our Science Curriculum uses the National Curriculum to ensure that children gain the knowledge they need to become successful scientists at primary school and beyond.

Implementation

At Copperfield Academy, scientific knowledge and enquiry skills are embedded in each unit the children study and knowledge and skills are revisited and developed throughout their time at school. Topics, such as Plants, are taught in Key Stage One and studied again in further detail in Key Stage Two. This allows children to build upon their prior knowledge, with weekly lessons and increases their enthusiasm for the topics whilst embedding this knowledge into long-term memory.

Impact

We measure the impact of our high-quality curriculum through:

- **A celebration of learning for each term which shows progression across the school.**
- **Pupil discussions about their learning including discussion of their thoughts, ideas, processing and evaluations of work.**
- **Termly assessment against the progression map to assess whether child is working at age related expectations for Science.**

Term	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	**The Natural World** **Children will know the names of body parts: shoulders, elbows, knees and ankles.** **Children will know the 5 senses.** **Children will know that this time of year is Autumn.**	**Seasonal changes** **What are seasons?** **Understand the seasons and how weather changes with them.**	**Materials** **Which materials are most suitable for playground toys?** **To explore the properties of different materials and how they may be suitable for different playground toys. Use this knowledge to design and test materials for other playground toys.**	**Rocks** **Where do rocks come from?** **To learn about the properties of different rocks.**	**States of Matter** **How do materials change state?** **To describe the properties of solids, liquids and gases and know the processes that cause something to change from one state to another. Apply this knowledge to the water cycle.**	**Properties of material and reversible changes.** **How can I change materials?** **To learn about materials, their properties and how they can change.**	**Electricity** **How can bulb brightness or a buzzer's volume be altered?** **To draw simple circuits using recognised symbols. To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit, comparing and providing reasons for variations.**
Autumn 2	The Natural World Children will identify plastic and metal. Children will know what material a magnet picks up.	**Building Materials** **What are materials?** **Explore and name different everyday materials and sort them into groups. Distinguish between an object and a material and be able to describe a material's properties.**	**Materials – Building a playhouse** **Which materials are suitable for building a playhouse?** **Identify properties of different materials and their suitability for a range of uses.**	**Forces and Magnetism** **What are forces?** **To understand forces and magnetism and the impact they have on our world.**	**Electricity** **How do we use electricity?** **To construct simple series circuits using knowledge of switches, electrical components, how to make a complete loop with a cell, conductors and insulators.**		**Animals including humans** **How does your blood flow?** **To know about the human body.**
Spring 1	**The Natural World** **Children will know that this time of year is Winter.** **Children will explore floating and sinking.** **Children will know and be able to explain how we are able to breathe.**	**Everyday materials.** **Where do materials come from?** **Explore and name some natural and man-made materials sorting them into groups. Distinguish between a material that is absorbent and waterproof and explain how scientists treat fabrics for different uses.**	**Animals including humans.** **What is the life-cycle of an animal?** **To understand the life-cycles of humans and animals.**	**Animals including humans –** **How does my body move?** **To understand the processes inside the body that help us to move and keep humans healthy.**	**Sound** **How is sound made and how can we change it?** **To explore how sound is made and how the volume and pitch can be changed.**	**Animals including humans** **What happens as we get older?** **To learn about the human life cycle.**	**Living Things and their Habitats** **Why is classification important in the scientific world?** **To understand classification of living organisms using taxonomy and branching data bases.**

Spring 2	**The Natural World** **Children will observe changes and growth of chicks.** **Children will know the life cycle of a chick.** **Children will know the time of year is Spring.** **Children will explore the strength of materials to make a house for the builders.**	**Plants** **What are the different types of plants and trees?** **Learning objectives: Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees.**	**Plants** **How does a seed become a plant?** **Observe and describe how seeds and bulbs grow into mature plants. Learn why plants need water, light and a suitable temperature to grow and stay healthy.**	**Plants – Parts of plants** **How do plants grow?** **Identify and describe the functions of different parts of a flowering plant. Explore requirements for life and growth. Investigate how water is transported within plants.**	**Animals including humans** **What happens to the food we eat?** **To be able to describe the basic parts of the human digestive system, identify the different types of teeth and know their simple functions.**	**Earth and Space** **What is around our planet?** **Know the names, movement and positions of the planets in our solar system. Understand the purpose of the Sun and the Moon.**	**Evolution and Inheritance** **How have living things changed over time?** **To recognise that living things have changed over time, as evidenced by fossils, to suit their environment and that they produce offspring with inherent characteristics.**
Summer 1	**The Natural World** **Children will know the names of the 4 seasons and weather associated with them.** **Children will know the life cycle of a sunflower.** **Children will know how to care for a plant.** **Children will observe how a tree has changed over the 4 seasons.**	**Animals including humans** **What are our senses?** **Understand basic parts of the human body, variations between individuals and some common changes over time. Learn the five human senses, explore how they work and the information they provide.**	**Living Things and their Habitats – Habitats** **Are humans predators, prey or both?** **To understand that plants and animals live in habitats and that they are dependent on each other to survive.**	**Plants – Seed dispesal** **How do we keep getting new plants? Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.**	**Living things and their habitats – Environmental** **To learn about changes, the impact, the environment and how we can help.**	**Gravity and Forces** **How do different forces affect the world around us?** **To understand gravity and resistance**	**Light** **How does light work?** **Know how shadows and reflections are made. Understand what colour is.**
Summer 2	**The Natural World** **Children will know that this time of year is Spring.** **Children will know that some animals can live underwater.** **Children will melt and solidify different substances such as chocolate and butter.**	**Animals including humans** **Why are animals different?** **Identify some key features of well-known animals and how to classify according to diet.** **Understand the purpose of camouflage.**		**Light** **How do we see things?** **Understand how light travels and how shadows are formed.** **Know how colour is made.**	**Living things and their habitats - Groupings / Classification** **Is a dolphin a fish?** **To be able to observe the characteristics of and ask questions about plants and animals that help to classify them in a scientific way.**	**All Living Things and their Habitats** **What Are the key similarities and differences between the life cycles of plants and animals?**	

KEY ASSESSMENT CRITERIA

EYFS

Understand the names of body parts: shoulders, elbows, knees and ankles. To know the 5 senses. To know what season it is and weather associated with it. To identify plastic and metal. To know what material a magnet picks up. To explore floating and sinking. To know and be able to explain how we are able to breathe. To observe changes the lifecycle of chicks. To explore the strength of materials to make a house for the builders. To know the lifecycle of a sunflower and how to care for a plant. To observe how a tree changes over the four seasons. To understand that some animals can live underwater. To understand how different substances like chocolate can melt and solidify.

Year 1

Understand different types of weather and seasons - including rainfall, wind and temperature change, Explore and name different everyday materials and sort them into groups, Identify and name a variety of common wild and garden plants, Identify and describe the basic structure of a variety of common flowering plants, including trees, Understand some basic parts of the human body, some variations between individuals and common changes over time. To know the five human senses, explore how they work and the information they provide, Identify key features of well-known animals and how to classify according to diet. To understand the purpose of camouflage.

Year 2

To explore the properties of different materials, To understand the life cycles of humans and animals, To understand what humans need to survive and how to stay healthy, Understand the development of a chicken in an egg, To observe and describe how seeds and bulbs grow into mature plants. Identify why plants need water, light and a suitable temperature to grow and stay healthy. To make observations using simple equipment, performing simple tests and gathering and recording data to help answer question, To understand that plants and animals live in habitats and that they are dependent on each other to survive.

Year 3

To identify properties of different rocks, To ask relevant questions and use different types of scientific enquiries to answer them, To understand forces and magnetism, To understand the processes inside the body that help us to move and keep humans healthy, Identify and describe the functions of different parts of a flowering plant. Explore the requirements of plants for life and growth and investigate how water is transported within plants, Explore the part that flowers play in the life cycle of flowering plants, Make careful observations to classify seed dispersal methods, To understand how light travels and how shadows are formed. Know how colour is made.

Year 4

To describe the properties of solids, liquids and gases and know the processes that cause something to change from one state to another. To apply this knowledge to the water cycle, To construct devices with simple series circuits using their knowledge of switches, electrical components, how to make a complete loop with a cell and conductors and insulators, To explore how sound is made and how volume and pitch can be changed, To describe the basic parts of the human digestive system, identify the different types of teeth and know their simple functions, To learn about changes that impact the environment and how we can help, to observe the characteristics of and ask questions about plants and animals, that help to classify them in a scientific way.

Year 5

To learn about materials, their properties and how they can change, To learn about the human life cycle, Know the names, movement and positions of the planets in our solar system. Understand the purpose of the Sun and Moon, To understand gravity and resistance, To understand the difference between sexual and asexual reproduction in plants and to compare the life cycles of different types of animal.

Year 6

To draw simple circuits using recognised symbols and to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit, comparing and providing reasons for variations, To know about the human body including the key parts of the circulatory system and the differences between cells, tissues and muscles, To understand classification of living organisms using taxonomy and branching data bases, To recognise that living things have changed over time, as evidenced by fossils, to suit their environment and that they produce offspring with inherent characteristic, Know how shadows and reflections are made. Understand what colour is.

VOCABULARY PROGRESSION

EYFS

Autumn, Beak, branch, bulb, chin, dark, dry, dull, ear, elbow, electricity, feathers, fin, flower, fruit, fur, garden, glass, grow, hard, horn, leaf, leaves, light, litter, loud, magnet, metal, noise, petals, plants, plastic, quiet, rain, root, rough, seasons, seed, shade, shiny, sight, skin, smell, smooth, snow, soft, soil, sound, sour, Spring, stem summer, Sunlight, weather, winter.

Year 1

Heat, Overcast, Temperature, Materials, Properties, Magnetic, Opaque, Stiff, Natural, Man-made, Absorbent, waterproof, pipette, trunk, living, wild, germination, reproduce, wild, seedling, evergreen tree, deciduous tree.

Year 2

Flexible, firm, fabric, rubber, windproof, reflective, translucent, transparent, life cycle, healthy, diet, exercise, germs, female, medicine, warmth, coniferous, survival, reproduction, habitat, microhabitat, diorama, consumer, invertebrate, food chain.

Year 3

Metamorphic, permeable, sediment, lava, igneous, anthropic, force, magnetic, attract, repel, pole, friction, skeleton, exoskeleton, bones, muscles, joints, contract, anchor, carbon dioxide, oxygen, pollen, transportation, life processes, seed formation, pollination, fertiliser, dispersal, beam, glare, transparent, reflect, light source, block.

Year 4

Change of state, condensation, evaporation, freeze, gas, liquid, melting point, precipitation, water cycle, solid, gas, circuit, component, renewable energy, electric current, insulator, component, cell, buzzer, digestive system, incisors, canines, molars, pre-molars, orifice, vegan, adaptation, urbanisation, climate change, environment, deforestation, annelids, antennae, crustaceans, thorax, species.

Year 5

Solvent, chemical, reversible, irreversible, evaporation, thermal, soluble, insoluble, foetus, embryo, womb, gestation, lifespan, hormone, axis, rotate, planet, Gibbous moon, waning, waxing, lunar, orbit, revolve, lever, gravity, resistance, Newton, streamline, anther, asexual, pistil, sepal, metamorphosis, stamen

Year 6

Atoms, electrons, neutrons, nucleus, protons, dimmer, circulatory system, blood, villi, arteries, blood vessels, organs, taxonomy, bacteria, organisms, hierarchies, phylum, evolution, homo sapiens, gene, inheritance, natural selection, absorb, emitted, refraction, scattered.

OVERVIEW OF SUBJECT/MONITORING/PROGRESSION/COVERAGE AND OUTCOMES

- Has the school made the objectives of their curriculum clear for your subject?
- Does the school's curriculum for your subject align with national policy and statutory requirements?
- How do you know your curriculum is working? Can you demonstrate how you know?
- Why is the curriculum right for the children in your school at this time?
- What are the strengths of your current subject curriculum?
- What are the areas of the curriculum that might need development?
- How effectively are curriculum policies and plans translated into practice?
- Is the same importance given to all foundation subjects?
- How is the curriculum delivered across each year group and across key stages, ensuring progress in skills, knowledge and understanding from different starting points?
- How is progress and attainment measured?
- How are pupils given opportunities to apply basic skills in your subject?
- Where is the evidence of pupils' SMSC development?
- What is the impact of the curriculum in your subject on the pupils' outcome