Castle Tower School

Science Policy

Date Ratified by Board of Governors	
Review Date	

Castle Tower welcomes pupils aged 3-19 who face a wide range of barriers to learning. Educational opportunities are provided within our Nursery, Primary, Secondary and Post 16 departments.

Our Vision

Vision:
To be a leading light in special education through educating, nurturing and inspiring all our school community.

Mission:
Castle Tower School is committed to creating a community which:

- Ensures everyone is safe and included
- Always learns
- Promotes independence and resilience
- Celebrates achievements
- Looks forward with hope to the future

Everything we do is driven by our core values:

- Child-centred
- Nurturing
- Fun
- Team work
- Inclusive
- Independence

Our Ethos
Castle Tower strives to create a caring community in which every member feels valued, supported and happy. All staff work to maintain an ethos in which fairness, tolerance, compassion and forgiveness permeate all relationships within the school community. High standards of respect, self-discipline, commitment and sensitivity are sought and everyone is encouraged to set and achieve the highest personal, academic and social goals. The safety, welfare and development of everyone in our school community is of paramount importance to all staff and Governors.
At Castle Tower, there is continued development of the quality of the teaching and learning environment. Resources are used efficiently. Opportunities are created for learning in co-operative and interactive settings. Pupils are presented with challenging as well as stimulating teaching and learning opportunities. Staff at Castle Tower seek close working relationships with other providers and services throughout each stage of our pupil's education and through the transition stage to further education and life after school.

Introduction

The Northern Ireland Curriculum seeks to empower pupils to achieve their potential and to make informed and responsible decisions throughout their lives. It is about helping pupils prepare for life and work:

- As individuals;
- As contributors to society;
- As contributors to the economy and environment.

Science has a significant role to play in this. It aims to stimulate pupils' curiosity and enthusiasm to develop a sense of wonder in the world around us. Developing skills in scientific methods of enquiry can help pupils to develop understanding of the processes of Science as well as content of scientific knowledge.

Using investigation and practical experiments increases motivation, supports collaborative working and connects learning about Science to the real world. Through this, pupils will develop their Thinking Skills and Personal Capabilities. Adopting a more enquiry-based and problem centred approach will spur pupils' critical and creative thinking. This will encourage them to ask more questions to develop and evaluate explanations of phenomena and events in the world around them.

Within the Northern Ireland Curriculum, there is a greater emphasis on taking time to learn with understanding, to consolidate pupils' knowledge and to enable pupils in making connections both within Science and with other areas of learning. A greater focus on skills and capabilities aims to develop pupils as independent learners

How Science can help meet the Northern Ireland Curriculum Objectives

Science **develops pupils as individuals** by:

- Helping pupils explore influences on their personal health and make choices for healthy living;
- Equipping them to make personal decisions about moral and ethical issues, now and in the future.

Science **develops pupils as contributors to society** by:

- Exploring the advantages and drawbacks of scientific and technological developments for industry, business, medicine and our overall quality of life;
- Exploring how the media informs us about Science and science-related issues.

Science **develops pupils as contributors to the economy and environment** by:

- Gaining an awareness of how the skills and knowledge developed in Science can be applied in life and work;
- Exploring the Science behind everyday products, particularly those manufactured locally;
- Gaining an appreciation of the role of Science in consumer issues;
- Challenging pupils to explore the consequences of their interactions with the environment;
- Becoming aware of the need for change to be sustainable and the importance of thinking globally, acting locally.

Why we believe it is important to teach science

Scientists at all levels, from children in the classroom to university researchers use skills of investigation to find out more about the world around them. For the child, the importance of teaching science is because:

1. Scientific knowledge can give a deeper understanding of the world.
2. Scientific attitudes can foster their curiosity and develop enquiring minds.

3. Scientific skills can equip children with strategies for finding out independently and solving problems.
4. Science has, does and will continue to play a major role in our modern society.

Context

This section should be copied and pasted into your policy form information below. Detail may be added to include additional information related to the area of learning.

Castle Tower School caters for pupils with special educational needs in the North Eastern area of the Education Authority. The school provides education for pupils from 3 to 19 years old with a wide range of barriers to learning.

At Castle Tower we celebrate the talents of each individual and strive to improve the quality of each person's life by developing confidence, tolerance, honesty, happiness and curiosity. We aim to develop within each individual the skills they require for a full and happy life and help them to be independent, ambitious and look forward with hope to the future.

The school is aware of and committed to the core D.E policy 'Every School A Good School (DE, April 2009). As such, it seeks to ensure a child centred approach with high quality teaching and learning taking place whilst effective leadership drives the school forward. Castle Tower also seeks to maintain close links to the local community.

At Castle Tower pupils are given the opportunity to learn in a safe, positive, pleasant and caring environment. There will be an emphasis on meeting individual needs through the use of IPPs. Pupils will be encouraged to develop a range of skills by following an educational pathway appropriate for them. The school provides a broad and relevant curriculum with a thematic approach to make learning more meaningful. Teaching involves adaptable, flexible teaching strategies that respond to the range of needs within the classroom.

The nurturing ethos of the school contributes to a safe, caring and happy environment where children are supported to help them overcome any barriers to learning.

At Castle Tower we encourage our young people to become involved in discussions and decisions on school life that affect them. We want our pupils to be self-motivated and take responsibility for their own learning and we use a range of strategies to promote this.

The school recognises the overarching aims and objectives of the N.I curriculum. Science can contribute substantively to these in the following contexts.

Aims of Area of Learning

As already stated the Northern Ireland Curriculum aims to empower young people to achieve their full potential and to make informed and responsible decisions through their lives. It aims to provide learning opportunities for each young person to develop as:

1. An individual
2. A contributor to society
3. A contributor to the economy and the environment

The Science Curriculum aims to;

- Deliver the statutory requirements as outlined in the CCEA documentation (APPENDIX 2)
- Enhance the children's understanding of the world.
- Encourage care and respect for the environment and the living things in it.

- Provide equality of opportunity.
- Develop curiosity and foster problem solving, exploration and discovery.
- Encourage co-operative skills as well as the growth of the individual
- Give pupils a sense of achievement.
- Encourage development of problem solving strategies in science, and transfer of these skills to other areas of the curriculum.
- Promote positive attitudes towards science and scientists.
- Deliver opportunities for the development of thinking skills and personal capabilities
- Deliver opportunities to develop Cross Curricular Skills – Using Mathematics, Using Information and Communications Technology ICT
- Plan for continuity and progression.

Learning and Teaching

a. Child centred approach

b.

- Science classes will adopt a Child centred approach in which the learning and teaching will be adapted to have the best interests of the pupils at heart and will have high realistic expectations for all. In practical terms this means that Topics will be selected which involve as much practical work as possible and are relevant and fun to our pupils

- Lessons will include visual, auditory and kinaesthetic elements to ensure access for children with different learning styles

- All lessons have clear learning objectives, to be shared and reviewed with the pupils.

- Lessons will make effective links with other curriculum areas and subjects, especially literacy, numeracy and ICT

- Activities should inspire the pupils to experiment and investigate the world around them, and to help them raise their own questions such as “Why…?”, “How…?” and “What happens if…?”. They should challenge, motivate and extend pupils learning

- Activities should develop the skills of enquiry, observation, locating sources of information, selecting appropriate equipment and using it safely, measuring and checking results, making comparisons and communicating results and findings

- All practical activities undertaken will be in line with the Health and Safety Policy.

Learning Environment

In science we use a variety of teaching and learning styles in the lessons. We encourage students to ask as well as answer questions. We offer them the opportunity to do investigations thus developing their practical skills. We enable them to use ICT in lessons where this serves to enhance their learning. Pupils take part in role-play, group work and discussions through enquiry -based activities. They engage in a wide variety of problem-solving activities. Pupils will be encouraged to develop independence through active learning.

We recognise that there is a variety of needs and abilities within the classroom and we provide suitable learning opportunities for all children through:

- Setting suitable learning challenges
- Referring to Individual progress plans when planning lessons

- Adopting a multi- sensory approach to cater for a range of learning styles – auditory. kinaesthetic and visual
- Providing resources of different complexity according to ability
- Using learning assistants to support individual and group work

Links with the Community

- We use the Northern Ireland curriculum as the basis for planning in Science but we have adapted this to the local context and circumstances. We make use of the local environment for fieldwork and visit places of significance to the pupils learning. Trips are arranged to enhance the curriculum where possible and appropriate.
- Students who we feel are capable to doing GCSE have the opportunity to do so at one of our BLT schools.
- We also recognise the invaluable support of parents and communicate with them on a regular basis

Links with other subjects

- Science contributes to the teaching of English by actively promoting the skills of reading, writing, speaking and listening. Pupils complete a variety of writing tasks, engage with a range of texts and develop oral skills through discussions and presentations.
- Science contributes to the teaching of Maths through the use of data handling when collecting results from investigations. The presentation and analysis of the results may involve calculations, charts and graphs.
- Science contributes to ICT as pupils often use ICT to enhance skills in data handling and presentation of written work. Pupils research information using the Internet. (see ICT section of this policy)
- Science supports Education for sustainable development. Castle Tower has been designated as an Eco school and pupils are encouraged to actively participate through using environmentally friendly products, recycling paper, plastic bottles and clothing. Pupils develop knowledge and understanding of sustainable practices through a range of topics including Materials (KS 3 /KS 4)
- Science contributes to the school ethos of a Health Promoting School through various topics including Your Health is Your Wealth (KS3) and Human Biology (KS4)
- Science supports careers education by highlighting the jobs that need science qualifications
- Links are made with Technology and Design in the teaching of the topics Electricity and Magnetism (KS3/4)
- Castle Tower has now got several, trained Forest School leaders. Having these, allows pupils to experience science in an outdoor, real-life setting.

Planning

We carry out curriculum planning for Environment and Society in three phases (long-term, medium-term and short-term). The long-term plan maps the topics to be studied in each term during each key stage. The medium-term plans use the Northern Ireland Curriculum and detail the learning intentions and activities for each unit of work for each term. The short-term plans involve the class teacher outlining the learning intentions and activities for each lesson. Self- evaluation and sharing of good practice is encouraged to ensure high standards of teaching and learning.

Planners are completed every 6-8 weeks for all year groups. These planners are very comprehensive and are placed on Microsoft Teams for all to view. Planners are evaluated during each unit and this informs planning in the following year. Planners are in accordance with the school planning policy and the appropriate format is used for each key stage. The science coordinator monitors and evaluates all the planning of the teachers

who teach science and holds the information in the Evaluating and Monitoring file in the classroom. There will be evidence of planning in the feedback sheet given to teachers in accordance with the policy.

Assessment and record keeping

Children's understanding of concepts is assessed at the beginning of and during a topic of work using informal judgements by teaching staff while observing them during lessons. Written work is marked in line with the school's marking policy. Children's science notes are also kept as a record of progress throughout the year.

Pupils will also be assessed on learning through simple practical projects, presentations and oral discussions. Science will contribute to the assessment of cross-curricular skills with topics identified for assessment in the curriculum overview. Pupils are encouraged to regularly share their successes and rewards are given for progress, effort and achievement.

Science work is recorded in booklets (stored in school in folders). Pupils are encouraged to take a pride in both the content and presentation of their work. When writing a report of an investigation in key stage 3 and 4 the pupils use a formal structure like the one below:

What do we want to find out?
What will we use?
What did we do?
What happened?
Why did it happen?

Effective use of ICT

Teaching may be enhanced and learning considerably enriched through ICT. Pupils may independently use tools such as sensors, microscopes and software applications to handle data, simulate processes, present and communicate their findings. ICT enables learners to detect and analyse patterns and trends in data that they have collected. Spread sheets and graphing software enable learners to represent data visually. ICT tools such as light sensors and temperature probes enable accurate measurements that would otherwise be at risk of significant error.

ICT can help pupils to:

- Access up-to-date statistics, images and factual sources using the Internet
- Obtain accurate measurements in experiments and investigations
- Collect data over a period of time
- Investigate real-life problems in an authentic context
- Store, retrieve, analyse and graph a range of data
- Access a range of online resources to promote and support independent research
- Plan, select, present and their work using text, graphs, pictures, sound or video
- Record all stages of an investigation, from initial questions to final outcomes
- Evaluate processes and refine their work

Digital Recording

Digital still photography and video have an important role. iPads may be used to record experiments in real time, contributing to pupils' recording of their work.

Data Logging

Data logging equipment enables pupils to make accurate spot measurements, typically of temperature, sound and light levels. Features of graphs may be labelled using the text tool. Logging may be carried out in real time (with the computer connected to the logger) or remotely. The logger may be set up to collect data (e.g. in the classroom overnight) and connected to the computer later, to download and display. Used well, sensors add depth, challenge and substance to the work. Pupils employ higher-order thinking skills as they interpret, discuss and hypothesise.

Investigations where data loggers may be used;

- Measuring pulse rate
- Materials changing state
- Sound/heat insulation
- Measuring the conditions in preferred habitats for mini beasts
- Length of days
- Temperature over a day
- Investigating changes in our environment
- How noisy, how quiet?
- Light sources and reflective surfaces
- What do plants need to grow?

Websites
Web sites are incorporated into planners

Overview
An overview of the topics taught in key stage 3 and 4 is included as Appendix 1. This indicates what is taught in each half term and is kept to as much as possible. On occasions topics are carried forward when school events interfere with the timetable.

Key Stage 3
Pupils learn about a wide range of living things, materials and physical phenomena. The statutory requirements in the Science Programme of Study and Learning Outcomes are incorporated in the KS3 Scheme of Work. They make links between ideas and explain things using simple models and theories. They apply their knowledge and understanding of scientific ideas to familiar phenomena, everyday things and their personal health. They think about the effects of scientific and technological developments on the environment and in other contexts. They carry out more systematic investigations, working on their own and with others. They use a range of reference sources including ICT in their work. They talk about their work and its significances, using a wide range of scientific language, conventional diagrams, charts, graphs and ICT to communicate their ideas.

Key Stage 4
Pupils follow the Revised Entry Level Certificate in Science CCEA Course introduced in September 2016. They study six modules in total two from each of the three sections. This course requires a portfolio of evidence to be kept for all the learning outcomes in each topic.

Resources
The learning resources are stored in the science storeroom in clearly labelled boxes. The science coordinator maintains oversight and purchase of new materials at regular intervals. Secondary sources used include video, IT software, the Internet, and a range of science topic books. Data logging equipment is stored in the classroom.
There is a detailed inventory of all equipment, which is updated when the requisition is completed and checked in June each year.

Roles and Responsibilities

It is the role of the co-ordinator to support colleagues in the teaching of Science, to communicate current developments in the learning area and provide direction for the area of learning in the school. The co-ordinator will provide the head teacher with a yearly action plan that evaluates the strengths and weaknesses in the subject area and indicates areas for further improvement.

The science coordinator monitors and evaluates all the planning of the teachers who teach science and holds the information in the Evaluating and Monitoring file in the classroom. There will be evidence of planning in the feedback sheet given to teachers in accordance with the policy

Monitoring and Evaluating

Monitoring of the standards of children's work and of the quality of teaching in science is the responsibility of the science coordinator to ensure continuity and progression throughout the school. The role of science coordinator also involves being informed about current developments in the subject, and providing a strategic lead and direction for the subject in school. An annual summary of science is made in which strengths and weaknesses in the subject are evaluated, and an action plan to address any issues arising is formulated for the forthcoming year.
The learning and Teaching process in Science is linked to the schools monitoring and evaluating policy. Planners are monitored once a term and classroom observations take place once a term. Feedback is given to the teachers completing science with their class. There is good communication and sharing of good practice between the staff through Microsoft Teams.

Health and Safety

Safety is of paramount importance in Science. There are many potential hazards and all of these are given consideration when lessons are planned.

- No member of staff No Entry
- Dangerous science equipment is locked in the science store and pupils are never allowed access unless supervised by staff
- Chemicals are stored safely. The CLEAPSS School Science Service is referred to for the safe use, storage and disposal of chemicals used in science.
- The science room is kept clean and tidy and surfaces kept as clear as possible. The room is very small and the classes work in no more than four groups when using Bunsen burners. The teacher, technician and LSA support are aware of the need to be vigilant during experimental work and the pupils closely supervised very closely.
- The gas supply is turned off at the mains at all times when not in use. Pupils are constantly reminded of potential hazards before and during experimental work.
- The technician checks equipment annually
- All equipment is put away at the end of the lesson and the pupils are encouraged to accept responsibility themselves under supervision

- Risk assessments are carried out before experiments are carried out with pupils

- Good discipline in the classroom ensures safety in the laboratory. If however a pupil becomes a danger to himself or others he/she will be removed by an LSA to the behaviour support team for a cooling off period
-