



# The Linden Centre

## Science Policy

Signed by:		
	Headteacher	Date:
	Chair of Management Committee	Date

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## Statement of intent

At **The Linden Centre**, Science provides the foundation for understanding the world around us. It can not only teach pupils about the world they live in, but also how to study it and make sense of various phenomena. As such, it is a fundamental aspect of all children's learning.

Through adherence to this policy, Linden Centre will not only ensure statutory compliance with the national curriculum, but also that all pupils have a solid grounding in science and a positive attitude towards scientific knowledge and experimental processes.

The aims of this policy include:

- Developing pupils' interest in, and enjoyment of, science. By building on children's curiosity, the science curriculum will help to instil a positive attitude towards science in pupils.
- Delivering all the requirements of the national curriculum in relation to science and covering major scientific concepts.
- Ensuring science lessons are purposeful, accurate and imaginative.
- Ensuring pupils have sufficient scientific knowledge to understand both the uses and implications of science, today and in the future. This will also give pupils an appreciation of the changing nature of scientific knowledge.
- The development of pupils' ability to pose questions, investigate these using correct techniques, accurately record their findings using appropriate scientific language and analyse their results.
- Helping pupils develop the skills of prediction, hypothesising, experimentation, investigation, observation, measurement, interpretation and communication.
- Making pupils aware of and alert to links between science and other school subjects, as well as their lives more generally.

## 1. Legal framework

1.1. This policy has due regard to statutory legislation and guidance including, but not limited to, the following:

- DfE (2013) 'Science programmes of study: key stages 1 ,2,3 and 4'
- DfE (2014) 'Statutory framework for the early years foundation stage'
- The Control of Substances Hazardous to Health Regulations (COSHH) 2002
- The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013

1.2. This policy will be used in conjunction with the following school policies and procedures:

- Health and Safety Policy
- Primary Science Health and Safety Policy
- Accident Reporting Procedure Policy
- Primary Assessment Policy
- Loaning School Equipment Policy

## 2. Roles and responsibilities

2.1. The subject leader is responsible for:

- Preparing policy documents, curriculum plans and schemes of work for the subject.
- Reviewing changes to the national curriculum and advising on their implementation.
- Monitoring the learning and teaching of science, providing support for staff where necessary.
- Encouraging staff to provide effective learning opportunities for pupils.
- Helping to develop colleagues' expertise in the subject.
- Organising the deployment of resources and carrying out an annual audit of all science resources.
- Liaising with teachers across all phases.
- Communicating developments in the subject to all teaching staff.
- Leading staff meetings and providing staff members with the appropriate training.
- Organising, providing and monitoring CPD opportunities in the subject.
- Ensuring common standards are met for recording and assessment.
- Advising on the contribution of science to other curriculum areas, including cross-curricular and extra-curricular activities.
- Collating assessment data and setting new priorities for development of science in subsequent years.

2.2. The classroom teacher is responsible for:

- Acting in accordance with Linden Centre's School Science Policy, ensuring that lessons are always taught in line with the school's Health and Safety Policy.
- Liaising with the science coordinator about key topics, resources and supporting individual pupils.
- Ensuring that all the relevant statutory content is covered within the school year.
- Monitoring the progress of pupils in their class and reporting this on an annual basis.
- Reporting any concerns regarding the teaching of the subject to the subject leader or a member of the senior leadership team (SLT).
- Undertaking any training that is necessary in order to effectively teach the subject.

### 3. The national curriculum

3.1. The national curriculum is followed and provides a full breakdown of the statutory content to be taught within each unit.

3.2. During **reception class**, in accordance with the 'Statutory framework for the early years foundation stage', focus will be put on the seven areas of learning, with the scientific aspect of pupils' work relating to the objectives set out within the framework.

3.3. During **years 1 and 2**, pupils will be taught to:

- Ask simple questions and recognise that they can be answered in different ways.
- Observe closely, using simple equipment.
- Perform simple tests.
- Identify and classify.
- Use their observations and ideas to suggest answers to questions.

3.4. During **years 3 and 4**, pupils will be taught to:

- Ask relevant questions and use different types of scientific enquiries to answer these questions, setting up simple practical enquiries, comparative and fair tests.
- Make systematic and careful observations and, where appropriate, take accurate measurements using standard units and a range of equipment, including thermometers and data loggers.
- Gather, record, present and classify data in a variety of ways to help answer questions.
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Use straightforward scientific evidence to answer questions or to support their findings.

3.5. During **years 5 and 6**, pupils will be taught to:

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of the results and the degree of trust in them. This should be in oral and written forms such as displays and other presentations.
- Identify scientific evidence that has been used to support or refute ideas/arguments.
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3.6. During **KS3**, pupils will be taught to:

- Pay attention to objectivity and concern for accuracy, precision, reproducibility.
- Understand that scientific methods and theories develop to take account of new evidence and ideas.
- Evaluate risks.
- Ask questions and develop a line of enquiry based on observations alongside prior knowledge and experience.
- Make predictions using scientific knowledge and understanding.
- Select, plan and carry out the most appropriate types of scientific enquiries including identifying independent, dependent and control variation.
- Use appropriate techniques, apparatus, and materials during fieldwork and pay attentions to health and safety.

- Make and record observations and measurements using a range of investigations and evaluate the reliability of methods
- Apply sampling techniques.
- Apply mathematical concepts and calculate results.
- Present observations and data using appropriate methods.
- Interpret observations and data.
- Present reasoned explanations, including explaining data.
- Evaluate data.
- Identify further questions arising from results.

3.7. During **KS4**, Pupils will be taught to:

- The ways in which scientific methods and theories develop over time.
- Using a variety of concepts and models to develop scientific explanations and understanding.
- Appreciating the power and limitations of science and considering ethical issues which may arise.
- Explaining every day and technological applications of science; evaluating associated personal, social, economic and environmental implications; and making decisions based on the evaluation of evidence and arguments.
- Evaluating risks both in practical science and the wider societal context, including perception of risk.
- Recognising the importance of peer review of results and of communication of results to a range of audiences.
- Using scientific theories and explanations to develop hypotheses.
- Planning experiments to make observations, test hypotheses or explore phenomena.
- Applying a knowledge of a range of techniques, apparatus, and materials to select those appropriate both for fieldwork and for experiments.
- Carrying out experiments appropriately, having due regard to the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.

- Recognising when to apply a knowledge of sampling techniques to ensure any samples collected are representative.
- Making and recording observations and measurements using a range of apparatus and methods.
- Evaluating methods and suggesting possible improvements and further investigations.
- Presenting observations and other data using appropriate methods.
- Translating data from one form to another.
- Carrying out and representing mathematical and statistical analysis
- Representing distributions of results and making estimations of uncertainty.
- Interpreting observations and other data, including identifying patterns and trends, making inferences and drawing conclusions.
- Presenting reasoned explanations, including relating data to hypotheses.
- Being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error.
- Communicating the scientific rationale for investigations, including the methods used, the findings and reasoned conclusions, using paper-based and electronic reports and presentations.
- Developing their use of scientific vocabulary and nomenclature.
- Recognising the importance of scientific quantities and understanding how they are determined.
- Using SI units and IUPAC chemical nomenclature unless inappropriate.
- Using prefixes and powers of ten for orders of magnitude (e.g. tera, giga, mega, kilo, centi, milli, micro and nano).
- Interconverting units.
- Using an appropriate number of significant figures in calculations.

#### **4. Cross-curricular links**

4.1. Wherever possible, the science curriculum will provide opportunities to establish links with other curriculum areas.

#### 4.2. **English**

- Pupils are encouraged to use their speaking and listening skills to describe what is happening.
- Pupils' writing skills are developed through recording their planning, what they observe and what they found out.
- Science based texts are sometimes used in English lessons and in guided reading sessions.

#### 4.3. **Maths**

- Science will involve a degree of numeracy at all levels.
- Pupils use their knowledge and understanding of measurement and data handling.
- Where appropriate, pupils record their findings using charts, tables and graphs.

#### 4.4. **ICT**

- Pupils will use ICT to locate and research information.
- ICT will be used to record findings, using text, data and tables.
- Pupils are encouraged to use calculators and other electronic devices, gaining confidence throughout their school experience.

#### 4.5. **PSHE**

- Health education is taught as part of the science unit about ourselves, which covers:
  - Health and growing
  - Teeth and eating
  - Moving and growing
  - Keeping healthy
  - Life cycles

#### 4.6. **History**

- Scientific discoveries and the contribution of individuals to science will be studied.

#### 4.7. **Spiritual development**

- Pupils' development will be focussed on the vastness of science and the natural world, encouraging a sense of awe.
- Pupils are encouraged to think about the effect of scientific discoveries on the modern world.

- Current scientific developments and issues will be discussed in the classroom, where appropriate.

## **5. Teaching and learning**

- 5.1. Pupils will be taught to describe associated processes and key characteristics in common language, as well as understand and use technical terminology and specialist vocabulary.
- 5.2. Lessons will allow for a wide range of scientific enquiry, including the following:
  - Questioning, predicting and interpreting
  - Pattern seeking
  - Practical experiences
  - Collaborative work
  - Carrying out investigations
  - Carrying out time-controlled observations
  - Classifying and grouping
  - Undertaking comparative and fair testing
  - Researching using secondary sources
- 5.3. Opportunities for outdoor learning will be provided wherever possible.
- 5.4. A science scheme of work is available to access on the shared drive; this can be used to promote progression throughout the school.

## **6. Planning**

- 6.1. All relevant staff members are briefed on the school's planning procedures as part of staff training.
- 6.2. Throughout Linden Centre, science is taught as a discrete lesson and as part of cross-curricular themes when appropriate.
- 6.3. Teachers will use the key learning content in the DfE's 'Science programmes of study: key stages 1-4 and the national curriculum as a starting point for their planning.
- 6.4. Lesson plans will demonstrate the balance of visual, auditory and kinaesthetic elements used in teaching, ensuring that all pupils with different learning styles can access the learning experience.
- 6.5. Long-term planning will be used to outline the units to be taught within each year group.
- 6.6. Medium-term planning will be used to outline the vocabulary and skills that will be taught in each unit of work, as well as highlighting the opportunities for assessment.

- 6.7. Medium-term plans will identify learning objectives, main learning activities and differentiation.
- 6.8. Medium-term plans will be shared with the subject leader to ensure there is progression between years.
- 6.9. Short-term planning will be used flexibly to reflect the objective of the lesson, the success criteria and the aim of the next lesson.
- 6.10. Short-term planning is the responsibility of the teacher. This is achieved by building on their medium-term planning, taking into account pupils' needs and identifying the method in which topics could be taught.
- 6.11. Short-term plans are solely for the benefit of the classroom teacher and do not need to be shared with the subject leader.
- 6.12. All lessons will have clear learning objectives, which are shared and reviewed with pupils.

## **7. Assessment and reporting**

- 7.1. Pupils will be assessed, and their progression recorded in line with the school's Assessment Policy.
- 7.2. Pupils will be assessed continuously throughout the year, as well as undertaking a summative assessment at the end of each academic year.
- 7.3. Throughout the year, teachers will plan on-going creative assessment opportunities in order to gauge whether pupils have achieved the key learning objectives.
- 7.4. Assessment in science is based upon scientific knowledge and understanding, rather than achievement in English or maths.
- 7.5. Assessment will be undertaken in various forms, including the following:
  - Talking to pupils and asking questions
  - Discussing pupils' work with them
  - Marking work against the learning objective
  - Specific assignments for individual pupils
  - Observing practical tasks and activities
  - Pupils' self-evaluation of their work
  - Classroom tests and formal exams
- 7.6. Formative assessment, which is carried out informally throughout the year, enables teachers to identify pupils' understanding of subjects and informs their immediate lesson planning.
- 7.7. In terms of summative assessments, the results of end of year assessments will be passed to relevant members of staff, such as the pupil's future teacher.

- 7.8. Parents will be provided with a written report about their child's progress during the summer term every year. These will include information on the pupil's attitude towards science, progress in understanding scientific methods, ability to investigate, and the knowledge levels they have achieved.
- 7.9. Verbal reports will be provided at parent-teacher interviews during the Autumn and Spring terms.
- 7.10. Pupils with special educational needs and disabilities (SEND) will be monitored by the special educational needs coordinator.

## **8. Equipment and resources**

- 8.1. Science resources for each unit are stored in appropriate areas.
- 8.2. The subject leader, in liaison with the headteacher, is responsible for ensuring that all resources and equipment are sufficiently maintained.
- 8.3. Equipment will be checked prior to each use by class teacher and any damages or defects must be reported to the subject leader immediately.
- 8.4. The subject leader is responsible for maintaining an inventory of resources.
- 8.5. Staff members must inform the subject leader of any changes regarding science resources, such as broken items or when new resources are required.
- 8.6. Any equipment or resources which are a cause of concern will be removed immediately.
- 8.7. The subject leader will carry out an annual audit of the science resources, reordering any consumables when necessary.
- 8.8. Class teachers can discuss the need for new resources with the subject leader.
- 8.9. The subject leader is responsible for negotiating requests from staff members and ensuring resources are bought within the amount allocated in the annual budget.
- 8.10. School equipment and resources will be loaned to individuals in line with the school's Loaning School Equipment Policy.

## **9. Health and safety**

- 9.1. Staff members will act in accordance with the school's Health and Safety Policy at all times.
- 9.2. Accidents and near-misses will be reported following the procedure outlined in the school's Accident Reporting Procedure Policy.
- 9.3. A risk assessment will be carried out by teachers before conducting an experiment or undertaking practical activities. .

- 9.4. All pupils will be shown how to correctly use equipment and will be monitored by staff members whilst using equipment.
- 9.5. All pupils will be made aware of how they are expected to behave, ensuring that they show respect to other people and the environment.
- 9.6. Pupils are made aware of the personal safety protocols and equipment needed when using different equipment or carrying out different tasks.
- 9.7. Staff members will be made aware of the COSHH and RIDDOR regulations as part of their induction training and will act in accordance with these whilst undertaking activities.
- 9.8. Any 'new' experiments or activities which a teacher has not used in the classroom before will be trialled prior to being performed with pupils.
- 9.9. At the beginning of any experiment, the teacher will outline the purpose of the experiment to the class, and all hazards and safety precautions will be thoroughly outlined.

## **10. Equal opportunities**

- 10.1. All pupils will have equal access to the entire science curriculum, including practical experiments.
- 10.2. Gender, learning ability, physical ability, ethnicity, linguistic ability and/or cultural circumstances will not impede pupils from accessing all science lessons.
- 10.3. Where it is inappropriate for a pupil to participate in a lesson because of reasons related to any of the factors outlined above, the lessons will be adapted to meet the pupil's needs and alternative arrangements involving extra support will be provided where necessary.
- 10.4. All efforts will be made to ensure that cultural and gender differences will be positively reflected in all lessons and teaching materials used.
- 10.5. The Linden Centre aims to provide more academically able pupils with the opportunity to extend their scientific thinking through extension activities such as problem solving, investigative work and research of a scientific nature.

## **11. Monitoring and review**

- 11.1. This policy will be reviewed on an annual basis by the subject leader, in collaboration with the headteacher.
- 11.2. The subject leader will monitor teaching and learning in science at The Linden Centre, ensuring that the content of the national curriculum is covered.
- 11.3. Any changes made to this policy will be communicated to all teaching staff.

