Subject Self Evaluation Form

Subject: Science

School Context
Katherine Semar Infant and Junior Schools serve an established and settled residential area in Saffron Walden. The socio-economic circumstances of the pupils are better than the average nationally although lower than the other schools in our local cluster. The proportion of pupils eligible for a free school meal is slightly below average although many families are on low incomes and need support through regular food banks and uniform referrals. The majority of parents are supportive but a significant minority have low aspirations and this has an impact on their support for their children's academic progress and on the extent to which they become involved in their children's learning. As a result of this, some of the pupil premium supports these families financially through clubs and educational visits. We have identified that 20% of our pupils have home lives that may negatively affect their school life and sometimes their ability to thrive (adverse childhood experiences). Significant work is completed to support these children through learning mentors and our school listening service as well as more recently employing a family engagement champion, who works with our most vulnerable children on improving attendance. A significant minority of our families live in the flats surrounding schools in overcrowded, damp accommodation without access to a garden. Unfortunately, we have had a high number of parents within our school community who have died or have been diagnosed with a life limiting condition. Within the last five years, we have had eleven children who have had a parent who has died. We have received support from charities like Winston's wish and our school educational psychologist. Currently we have two children who are supporting a parent cope with multiple sclerosis and we have ten children in last two years whose parent has been diagnosed with cancer. In the infant school, we also have a child whose father is receiving specialist care and hoping that may prolong his life for six months. We have used our school play therapist to support these children and we have two trained learning mentors who have received additional training on grief and bereavement. We have looked at our PSHE curriculum and worked on the zones of regulation as well as work on grief and bereavement to support the children in our school. We have re-designed our curriculum and changed the books in Year Three as we felt ‘The Wild Way home’ was triggering for the two children whose Mothers have recently died. In Year Two, three of the children can be dysregulated for sustained periods of time and we are continually looking for the best ways to support them with their grief. The largest ethnic groups are White British (75.98%) and any other white background (16%). Mixed White & Asian (1.44%), Mixed White & Black Caribbean (1.15%). Mixed White & Black African (0.92%), Mixed any other mixed background (2.07%). The percentage of children who are not white British has increased by 6.2% since last year. This school has 12 out of 17 possible ethnic groups. The average number of groups for this phase of education is identified as 9 so we like to celebrate our cultural diversity. Staff retention is very high. This means the shared vision and ethos is well-developed as staff have built this vision with staff team. Monitoring, evaluation and review has happened in a cycle where each subject has a deep dive on a rolling programme which has happened for the past 12 years so experienced subject leaders know their subject’s strengths and areas for development well.

The school currently holds:
The Healthy Schools' Enhanced Award
Sports Mark – Platinum Award
Music Mark
Philosophy for children Silver Award

Katherine Semar Infant and Junior Schools are not faith schools but our ethos is broadly Christian. We have close links with St Mary's Church, which is the nearest Anglican Church, as well as the community church and the Baptist church regularly having assemblies from the Saffron Walden assemblies team. Inclusion is a school priority and we welcome and value diversity. We are particularly keen to build on the supportive relationships we have forged with many partners involved with the school. The school focuses on promoting high academic achievement, providing plentiful opportunities for sport and exercise, creative arts and personal development. Promoting good health is a school priority.

Saffron Walden and the local surrounding area does not have any specialist provision locally and consequently we have a number of children with severe and complex needs who are seeking specialist provision. The LA have placed them in our school whilst looking for a specialist setting. In response to this the Trust are looking at providing specialist provision but this is in an early stage of planning.

The infant and junior schools work extremely closely to further enhance the continuity for children and cohesive community provision. The infant and junior school operate as one school, which has been developing since 2011 when Julie Puxley became the headteacher. This has been further enhanced by Julie Puxley becoming executive headteacher in 2017 of the Junior school and infant school as well as the rest of Senior Leadership Team working across both schools. The children have a smooth transition from Year 2 to Year 3 and beyond. There is now a single governing body, policies, procedures and governor training is aligned. We continue to have a joint website and joint weekly newsletter for parents. We have shared co-ordinator posts, enriching subject leadership. Planned, shared staff meetings and training are of a high quality and create continuous professional development for staff. There is a deeper understanding of the progression of learning between key stages and shared assessment methods. The SLT work together daily to enhance provision in classrooms, using staff specialisms. Due to high staff retention the shared vision and ethos is well-developed as staff have built this vision with key stakeholders over a number of years.

Baseline
Understanding the world 60% EXS+ 8% GDS **Listening** 72% EXS+ Listening 29% GDS **Speaking** 67% EXS+ Speaking 17% GDS **Understanding** 74% EXS+ Understanding 25% GDS

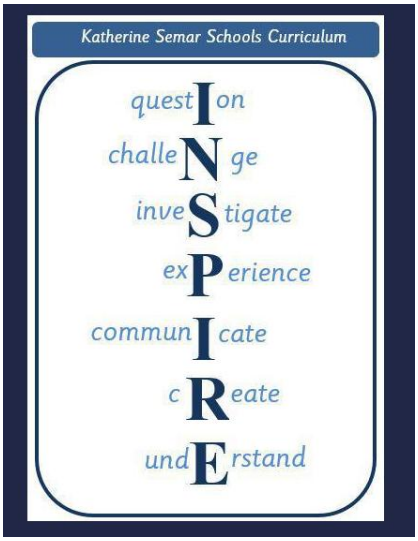
School vision

School Values

Our curriculum cannot be separated from our school's core values: be kind, be confident, be curious, be positive, be respectful and be resilient. These permeate all aspects of school life and underpin our school curriculum. Although these are directly taught within our curriculum they are also 'lived' throughout our school and effectively create the culture that allows our curriculum to be successful.

Curriculum Aims

Alongside our school values, we have a set of aims for our school curriculum. These are the key threads that underpin and link our children's curriculum experiences together. We want children to: question; challenge themselves and each other; investigate the world around them; experience the world first hand; communicate effectively; and seek to develop their understanding of themselves, each other and the world around them. These aims were developed by and for the school community; parents, teachers, staff and governors collaborated to create our INSPIRE curriculum aims.



Intent

Purpose

Our high-quality science curriculum provides the foundation for understanding the world. Science has changed our lives and is vital to the world's future prosperity; all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science.
Our science curriculum aims progressively to build up a body of key foundational knowledge and concepts appropriate to age and stage of our pupils. Pupils are encouraged to recognise the power of rational explanation and dialogue and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science may be used to explain occurrences, predict how things will behave, discuss and analyse causes. Children are encouraged to use enquiry and curiosity to question and test their ideas. At KSS we are developing and following an enquiry based science curriculum based around a key blend of knowledge and scientific skills in order to use practical work to help pupils to learn substantive knowledge..

Our curriculum for science aims to ensure that all pupils:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.

- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- Ensure they are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Implementation

Science long term plan

- Each year group will teach the areas of Science identified in the school's long term plan to ensure coverage of statutory knowledge and skills.
- Each year group will teach all areas of Working Scientifically through planned investigative work, as identified in Year Group planning.
- The school's Science progression of skills will be used to identify the learning objectives for each year group, in line with the school's raised expectations.

Cross-curricular learning and real world contexts.

- Wherever possible, a cross-curricular approach will be taken to the teaching of Science. Lessons will often be linked to children's learning in English, Maths, Computing, Geography, PSHE etc.

Topic launch and land

- Each half term topic will begin with a cross-curricular launch event to engage and motivate the children. This will also act as 'knowledge harvest' allowing teachers to assess children's existing knowledge and skills in order to adapt planning and ensure appropriate levels of challenge for all children.
- Each half term will end with a land event which celebrates children's learning and progress. This will involve the children communicating their learning in some way, for example exhibitions or assemblies.

Fieldwork

- We understand, through analysis of relevant research, that fieldwork is an essential element of an outstanding Science curriculum and therefore ensure it is a high priority for all learners.
- Fieldwork is carried out in every year group across the school and the skills progression ensures children gradually build their fieldwork skills across the school.

Challenge and Support for all Learners

- We understand that every learner develops differently and adapt our provision continuously to ensure every child receives the correct balance of support and challenge in order to achieve their very best. We recognise this fact and provide suitable learning opportunities for all children (including those who may be gifted and talented or have additional needs) by matching the challenge of the task to the ability of the child. Each child is valued, respected and challenged regardless of ability, race, gender, religion, social background, culture or disability.

Assessment

- We use MAPP (Mapping attainment and progress for pupils**)** to assess children's progress against the expectations of our INSPIRE curriculum. We assess children

against both the requirements and standards of the National Curriculum as well as our school's own raised expectations for all children. We assess them in working scientifically as well as their knowledge and understanding in each aspect of their study.

Scientific Knowledge and Conceptual Understanding, Spoken Language and Development of Higher-order Vocabulary

- Our scheme of work aims to develop scientific and conceptual understanding through a sequence of knowledge and concepts. However, we also believe that it is vitally important that our pupils develop **secure** understanding of each key block of knowledge, vocabulary and concepts in order to progress to the next stage. For this reason we have developed knowledge organisers to identify the key learning and Tier 3 vocabulary for each unit of work. These have been developed systematically across KS1 and KS2 collaboratively with the aim to avoid insecure, superficial understanding and will develop understanding of higher-order content. Pupils will be able to describe associated processes and key characteristics in common language but also be familiar with and use technical terminology (Tier 3) with accuracy. The knowledge organisers allow for a build-up of extended specialist vocabulary.
- Our science curriculum is also planned to enable children to apply their mathematical knowledge to their understanding of science. In all key stages, children apply mathematical skills including collecting, sorting, presenting and analysing data.

The nature, processes and methods of science

- 'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It is not taught as a separate strand.
- Each unit of learning is planned to incorporate key features of scientific enquiry (such as observing over time, pattern seeking, identifying, classifying, grouping, comparative and fair testing, and researching using secondary sources).
- Pupils learn to use a variety of approaches to answer relevant scientific questions.

High-expectations

- Our curriculum is designed with the national curriculum as a starting point but as we have extremely high expectations for our children so we have added additional challenge. These can be seen in the bold objectives in our INSPIRE curriculum. Although there is no requirement in the national curriculum, in order to give children an opportunity to begin to think how key concepts in forces and electricity affect our everyday life, we introduce our Key Stage 1 children to Forces within our Wheels, Wings and Wonderful Things topic in Year 1, and to Electricity with the Lighthouse Keeper's Daughter topic in Year 2 as part of DT. In addition, we have used our Forest School, trips and outdoor environment to enrich our learning in science.

Impact

Science July 2024	Y1	Y2	Y3	Y4	Y5	Y6	KS1 average	KS2 average
Total	60	60	61	59	60	78	120	258
Foundation%								
Working Towards%	5	12	16	14	7	5	8	10
Expected + %	95	88	84	86	93	95	92	90
Higher Standard%	17	23	23	41	28	44	20	34

Disadvantaged								
Total	4	8	9	8	6	5	12	28
Foundation%								
Working Towards%	25	38	44	25	17	20	31	27
Expected + %	75	63	56	75	83	80	69	73
Higher Standard%	25	13	11			20	19	8

Not Disadvantaged								
Total	56	52	52	51	54	71	108	228
Foundation%								
Working Towards%	4	8	12	12	6	3	6	8
Expected + %	96	92	88	88	94	97	94	92
Higher Standard%	16	25	25	47	31	46	21	38

SEN								
Total	6	4	7	10	8	6	10	31
Foundation%								
Working Towards%	17	25	57	60	50	17	21	46
Expected + %	83	75	43	40	50	83	79	54
Higher Standard%	17					17	8	4

Not SEN								
Total	54	56	54	49	52	70	110	225
Foundation%								
Working Towards%	4	11	11	4		3	7	5
Expected + %	96	89	89	96	100	97	93	95
Higher Standard%	17	25	26	49	33	47	21	39

EAL								
Total	13	11	11	8	10	13	24	42
Foundation%								
Working Towards%	15	18	18	13		8	17	10
Expected + %	85	82	82	88	100	92	83	90
Higher Standard%	8	27	27	50	10	46	17	33

Not EAL								
Total	47	49	50	51	50	63	96	214
Foundation%								
Working Towards%	2	10	16	14	8	3	6	10
Expected + %	98	90	84	86	92	97	94	90
Higher Standard%	19	22	22	39	32	44	21	34

Boys								
Total	32	32	32	19	29	39	64	119
Foundation%								
Working Towards%	3	9	9	5	7	3	6	6
Expected + %	97	91	91	95	93	97	94	94
Higher Standard%	16	31	28	37	34	51	23	38

Girls								
Total	28	28	29	40	31	37	56	137
Foundation%								
Working Towards%	7	14	24	18	6	5	11	13
Expected + %	93	86	76	83	94	95	89	87
Higher Standard%	18	14	17	43	23	38	16	30

Commentary:
Attainment in science at Katherine Semar remains consistently high on average and significantly above the national average of 81% working at expected level reported in 2024. In Y6 disadvantaged children achieved the national average. EAL children perform as well as non-EAL children which supports the success of oracy in science. In KS1 there remains a disparity between SEN and non SEN children. Training is planned for support staff to work with children in a one to one capacity using the PSTT resources , 'Science in my pocket' and following the participation in the Focus4TAPS trial to support working scientifically.

Significant developments in the subject

- Medium term planning format has been rolled out wherein prior and future learning is included, alongside misconceptions and new vocabulary. In addition, each medium term plan should show enquiry icons to show working scientifically focus with explicit planning for teaching disciplinary knowledge.
- Book scrutiny, pupil interviews have demonstrated that pupils are using a wide range of Tier 3 vocabulary with increasing accuracy in discussion and their written work.
- Close liaison for planning with individual year group colleagues.
- Staff survey undertaken to ascertain CPD needs.
- Science vocabulary progression developed (Summer 2021) establishing specific Tier 3 vocabulary to be taught in each year group. This needs revisiting due to slight variations in need following disruption during lockdowns.
- Best practice guide rewritten in light of most recent Ofsted report and subject monitoring.
    - Early years milestones incorporated into subject progression document.
    - Link made with local Stem facilitator with a view to running STEM training for local schools from KSS.
    - Whole School Teacher CPD on use of knowledge organiser and scientific enquiry within SoW.
- Sharing of assessment materials, particularly for working scientifically shared and promoted to all teaching staff.

- Revisit of long term plan and from Autumn 23 Year 6 will now teach the light topic historically moved to Year 5.

Strengths

- Subject leaders CPD – attend regular personal CPD and Science Leader Updates. One subject leader is a STEM Facilitator.
- Both subject leaders have passion and good to excellent subject knowledge, including secondary experience.
- Liaison with secondary school, including transition activities in science with Year 6.
- Ability to access resources from secondary school.
- Subject leaders support colleagues in areas of knowledge and resourcing and teaching pedagogy.
- High level questioning to deepen scientific thinking and enquiry.
- Collaborative learning opportunities amongst peers.
- Staff take many opportunities to plan and deliver 'hands on' learning and seek to create an exciting ethos around the delivery of the subject, including hooks such as trips, dissection, creative investigations.
- Clear progression documents for both working scientifically and knowledge as well as Tier 3 vocabulary**.**
- Four-yearly Science Focus Week. Successful Science Week in 2023, with a huge engagement from parents and SWCHS.
- Big Bang Science Fair (KS2).
- We have a number of links through parents who work in the scientific community locally (e.g. Genome Centre, Astra Zeneca, Cancer Research).
- Children show excitement and enjoyment of science. Science lessons rank in the top third of all subjects in school. (Pupil Survey 2024)
- The development of knowledge organisers for areas of the Science curriculum across year groups has allowed class teachers and leaders to look in depth and revise the skills and knowledge taught in each year group to allow for greater progression. A joint meeting was held with RAB (Spring 2020) to further develop the content required for knowledge organisers for each strand of Science to ensure clear progression.
- Book scrutinies, pupil interviews and class drop-ins have demonstrated that pupils are using a wide range of Tier 3 vocabulary with increasing accuracy in discussion and their written work.
- Early Years milestones have been incorporated into the progression document.

Areas for development

- Further development of use of school outdoor areas.
- To create further opportunities for enrichment and cultural capital eg KS5 pupils / secondary colleagues / visits.
- Greater links to STEM ambassadors.
- To maintain and revisit children's acquisition and retention of tier 3 vocabulary in Science by creative use of high quality knowledge organisers with a clear progression across each area, including knowledge notes (see CUSP materials).
- To continue incorporate aspects of enquiry skills and types within retrieval practice and MTP using a consistent icon system to ensure that children are able to articulate working as a scientist and to ensure that they are KS3 ready at the end of KS2.
- To use the 7 Step Mastery Teaching and Learning Sequence within lessons or units as appropriate.
- To ensure that staff are making use of PLAN assessment documents when making teacher assessments at the end of topics.
- Ensure that teachers are accessing TAPS assessment enquiries to enable consistent assessment practices in working scientifically across the schools.

- In pupil voice (Summer 2), the pupils were generally not confident in naming disciplinary knowledge in terms of enquiry types and skills. A frontispiece for books differentiated for KS1 and KS2 has been developed and forthcoming staff training from science leads will focus on increasing pupils' ability to recognise, choose and name appropriate types and skills in terms of working scientifically.

Monitoring and evaluation systems

At Katherine Semar we believe that the most effective way to monitor the impact of our Science policy is to utilise and triangulate a broad range of moderating activities, involve our stakeholders, and apply these regularly, consistently and robustly. Through our annual Monitoring, Evaluation and Review cycle, we employ the following monitoring activities in Science:

- **Lesson Observations and Learning Walks**
  - Senior Leaders and Subject Co-ordinators regularly undertake planned and unplanned lesson observations and learning walks. These have a clear focus and feedback and findings are used to inform individual and whole-school Continuing Professional Development (CPD), School Development Planning and future monitoring activities.

- **Internal Assessments**

  In line with the school's assessment policy, each year group undertakes a range of internal assessments as appropriate to their age and stage of development. Data from these assessments is used to inform planning, teaching, interventions, and adult support to ensure all children are making maximum progress.
- **MAPP (Mapping attainment and progress for pupils)**

  We use MAPP to assess children's progress against the expectations of our INSPIRE curriculum. We assess children against both the requirements and standards of the National Curriculum as well as our school's own raised expectations for all children. This is analysed annually and used to inform our school development plan.
- **Work Scrutinies**

  Work scrutinies are carried out by subject coordinators, Senior Leadership Team and whole staff.
- **Pupil Conferences**

  Every child from Year Two to Six has a learning mentor from the senior leadership team. They have individual pupil conferences each term which supports children to take ownership of their own learning, review their progress and set themselves development targets.
- **Governor Visits**
  - As part of the Governors' Monitoring, Evaluation and Review cycle, lead governors in each subject, make regular visits to school to monitor progress towards the school development plan.
  - Monitoring activities include a range of teaching and learning observations, discussions with subject co-ordinators, meetings with pupils, visits to subject specific celebration assemblies, work scrutinies and subject leader reports.
- **Pupil interviews**

- Senior staff, subject co-ordinators and governors take regular opportunities to listen to the views of pupils in relation to their experience of Science at our school and their feedback actively informs subject development through our curriculum action plan.

SMSC

Spiritual

- Consider the fact of life, growth, decay and death and how different organisms are dependent upon each other.
- Using senses to become aware of the world around them.
- Appreciating the beauty of the natural world.
- Asking questions about life and its origins.
- Developing a sense of awe and wonder at the complexity and pattern in natural phenomena.
- Being fascinated by how things work and what might happen.
- Encouraging a sense of wonder in scientific discovery.
- Working with 'variables' – learning to test hypotheses, accept failure and try again.
- Learning to value and respect all forms of life.
- Ethical issues – medical, nuclear, environmental and the pursuit of truth in science v value of human life.

Moral

- Looking at good and bad uses of drugs.
- Moral issues in the human food chain.
- Moral issues surrounding animals, including pets.
- Recognising the need for a fair test.
- Exploring the consequences of certain action e.g. decomposition.
- Investigating the laws of nature.
- The scientific skills of making predictions, observing and drawing conclusion are helpful in considering moral issues.
- Consider topics where science and religions both have something to say e.g. about the origins of the world, issues in medical ethics.

Social

- Relating their understanding of science to their personal health e.g. personal hygiene, drugs, diet, smoking, exercise.
- Looking at health and safety issues.
- Considering how to treat living things and the environment with care and sensitivity.
- Looking at the ways in which the environment needs protection.
- Exploring why they need to look after the environment.
- Exploring the part played by science in civilisation.
- Investigation in groups, sharing expertise and skills.
- Science as a co-operative activity requiring communication and interaction.

Cultural

- Recognising similarity and differences between themselves and other pupils.
- Becoming aware that scientific discovery is worldwide and not a 'western' phenomena.
- Creation stories from different cultures alongside scientific stories.
- Scientific development in relation to others – water supplies, new varieties of flowers and food crops.

Training
Please see Training Folder.

Enrichment
• Science week in a four yearly cycle. • External providers e.g. planetarium, raptor visit. • External visits, Museum of Zoology and Geology, forest school, Colchester Zoo, Boydells Farm, Wicken Fen, Sealife Centre, Bempton Cliffs, York Museum, RAF Hendon. • School environment including Wildlife garden. • Big Bang Fair. Annual. • Visiting scientist parents. • FlyTrap project with Wellcome Trust scientists as part of the Darwin Tree of Life project – Year 5 • Science Week 2023 Summer