Science Policy

2024

Our Mission:

'To develop responsible, independent individuals who love learning and have the knowledge and attitudes to be successful in an ever changing world'.

St. Lawrence Primary School

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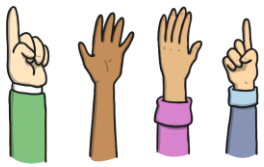
As a Rights Respecting School, our philosophy is underpinned by the values and principles of the United Nation's Convention on the Rights of the Child (UNCRC).

Articles from the UNCRC which are directly linked to the PSHE curriculum at St. Lawrence School:

Article 12

You have the right to give your opinion, and for adults to listen and take it seriously.



Article 13

You have the right to find out things and share what you think with others, by talking, drawing, writing or in any other way (unless it harms or offends other people).

Article 17

You have the right to get information that is important to your well-being, from radio, newspapers, books, computers, and other sources. Adults should make sure that the information you are getting is not harmful, and they should help you to find and understand

Article 28

You have the right to a good-quality education. You should be encouraged to go to school to the highest level you can.

Article 29

Your education should help you use and develop your talents and abilities. It should also help you learn to live peacefully, protect the environment and respect other people.

As Duty Bearers, it is our responsibility to teach children their rights. This is done predominantly through PSHE sessions. Children learn about their rights, through their rights and for their rights. Staff and young people have an understanding that rights are inherent, inalienable, indivisible, universal and unconditional, using language appropriate to children and young people's age and ability.

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Mission

To develop responsible, independent individuals who (love learning and) have the knowledge and attitudes to be successful in an ever changing world.

Ethos and beliefs

School should be about empowering children to be successful in an ever changing world. By providing rich and memorable learning experiences and engaging our children through hands on activities, we support the development of their skills as well as their knowledge and understanding.

It is important to us that children are able to connect what they do at school to the real world and that they learn how to think creatively and solve problems, both independently and collaboratively. As such, we enable children to take on responsibilities, to make choices about their learning and to find out their own interests and fascinations.

Core Values

Independence:

- We are confident to be unique
- We respect each other inside and out
- We are happy for our own and for each other's successes

Responsibility:

- We treat others how we would like to be treated
- We tell the truth
- We care about each other's feelings

Success

- We ask questions and figure things out for ourselves
- We listen in a respectful way
- We try our best and learn from our mistakes

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Aims and Objectives

We live in an increasingly scientific and technological age where children need to acquire the knowledge, skills and attitudes to prepare them for life in the 21st century.
We, at St. Lawrence Primary School believe that the teaching of science develops in children an interest and curiosity about the world in which they live, and fosters in them a respect for the environment. Science stimulates and excites children's curiosity about phenomena and events in the world around them. It teaches methods of enquiry and investigation to stimulate creative thought. We believe that the teaching of science develops in children an interest about the world in which they live, and fosters in them a respect for the environment.

Through our Science teaching we aim to:

- Equip children to use themselves as starting points for learning about science, and to build on their enthusiasm and natural sense of wonder about the world.
- Raise standards of achievement and attainment in science.
- Develop through practical work, the skills of observation, prediction, investigation, interpretation, communication, questioning and hypothesizing, and increased use of precise measurement skills and ICT.
- Encourage and enable pupils to offer their own suggestions, to be creative in their approach to science, and to gain enjoyment from their scientific exploration.
- Enable children to develop their skills of co-operation through working with others, and to encourage where possible, ways for children to explore science in forms which are relevant and meaningful to them.
- Teach scientific enquiry through contexts taken from the Jersey Curriculum for science.
- Encourage children to collect relevant evidence and to question outcome and to persevere.
- Encourage children to treat the living and non-living environment with respect and sensitivity.
- Stress the need for personal and group safety by the correct usage and storage of resources.
- Enable children to appreciate that we do not always know the answers and results when carrying out scientific enquiry.
- Ask and answer scientific questions.

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Planning

The long and medium term science planning can be found in Teacher shared, planning. It is the role of the science leader to compose the long-term plan, which is reviewed annually.

The requirements in the long-term plan are taken from Hamilton and Plan Bee schemes as well as the Science Jersey Curriculum (Working Scientifically and Programme of Study).

It is the responsibility of the class teachers to generate the medium term plan (have access to Hamilton and PlanBee) and weekly plans (in a format they seem fit) which are in line with the long term planning requirements and therefore have clear learning objectives. In some cases, the learning objectives are shared with the children as a scientific question and noted on the planning. It is the role of the science leader to monitor and advise teachers on medium and short term planning giving feedback and assistance where necessary.

Marking/ Assessment

Marking of the children's work is completed in line with the school's marking policy(see Appendix 2). It is also the responsibility of the class teacher to maintain an overview of each child's progress in science. A variety of strategies including observations, questioning, discussion and marking are used to formatively assess progress against the learnt objectives. This information is used to identify what is taught next.

During half termly science investigations (linked to the Cornerstones Love to Investigate), teachers observe children at work and make a judgement of their performance against age related expectations using "Jersey Scientific Enquiry, Skills Progression Framework'.

Teachers use quiz questions to test children's knowledge of the science programmes of study at the end of each unit of work, using PlanBee materials.

Scientific Language

In all year groups, scientific language is modelled by the class teacher and encouraged to be used by the children. This is in relation to both scientific enquiry and topic specific vocabulary. Where possible, this specific language is visually available to the children (e.g. via a word mat or display). With the teacher's discretion, children's spellings of scientific language are also corrected.

Teaching of Science

To provide adequate time for developing scientific knowledge, skills and understanding, each teacher provides weekly science lessons and one ' independent investigation' half termly. Cross-curricular links are also made where possible to enhance the learning of science, e.g. through writing about scientific phenomena, using maths to represent data and using ICT to document findings. The science leader monitors the teaching and learning of science via termly 'book looks' and provides necessary feedback.

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Health and Safety

The safe use of equipment and consideration of others is promoted at all times. Some general risk assessments have been taken from the CLEAPS website (see Appendix) and read/amended by class teachers when necessary before specific tasks are carried out/ equipment is used. Children are made aware of safety issues and, where appropriate, the reasons behind them. In most cases, dynamic risk assessments are continuously carried out by the class teacher. Activities which take place away from the school's premises require a risk assessment form to be filled in.

Resources

The school holds a central bank (science cupboard) of resources. The science leader is responsible for maintaining this area and ordering any necessary items that have been identified as a need. All staff members are responsible for collecting and returning necessary items to the correct place to ensure that resources are easy for all staff to find.

Equal opportunities

All children at St.Lawrence School are given equal opportunities in all areas of science. We are committed to providing all children with an equal entitlement to scientific activities and opportunities regardless of race, gender, culture or class.

Working Scientifically

Where possible, 'Working Scientifically' requirements are taught through and clearly related to the programme of study.

Through this approach we aim to develop the following skills:

Exploring, observing, classifying, noticing patterns, fair testing, problem solving, applying models, raising questions, predicting, hypothesising, planning, controlling factors, measuring, collecting and interpreting data, constructing tables and graphs, explaining, communicating and evaluating findings and researching information.

Early years

At Foundation level, science is an integral part of learning and is embedded throughout activities and play. At this stage, science is taught within 'Understanding the World'. As the Nursery and Reception classes are part of the Early Years Foundation Stage, we relate the scientific aspects of the children's work to the objectives set out in the 'Development Matters' and 'Early Learning Goals (ELGs)' which underpin the curriculum planning for children from birth to age five. The programme 'EXATT', which divides the 'ELGs' into smaller objectives, is also used in foundation stage as an assessment tracker.

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CLEAPSS

STUDENT SAFETY SHEETS 71

Sharps

including **scalpels, knives, syringe needles, seekers, etc** (2013)

Source	Hazard	Comment
Scalpels, knives and other blades	DANGER	Cuts and puncture wounds can lead to infection, especially if the blade or point is contaminated by contact with living or once-living material. Careless use and handling of scalpels, syringes with needles, seekers and other sharps can lead to cuts and puncture wounds. Sharp scalpels are safer to use than blunt ones because there is less risk of them slipping as less force needs to be used. Carrying scalpels, syringes with needles, seekers and other sharps especially in crowded rooms, can present a hazard to the user and others. Carelessly-disposed sharps can present a hazard to waste handlers and others.
Syringe needles	DANGER	
Seekers and other sharps	DANGER	

Typical control measures to reduce risk

- Follow your teacher's guidance on safe practice in relation to the material being dissected.
- Cut in a direction away from yourself and where possible cut using a cutting board, dissection tray or pad or similar.
- Wear eye protection when changing scalpel blades or cutting material likely to "flick" (eg, cartilage or bone).
- Count sharps at the beginning and end of the lesson.
- Carry sharps with the blade or point protected, eg in a shallow tray, and do not carry them at all if you are likely to be jostled..
- Dispose of used sharps in a proper, safe container, eg a sturdy box, clearly labelled, and sealed and wrapped before disposal.

Assessing the risks

- ***What are the details of the activity to be undertaken? What are the hazards?***
- ***What is the chance of something going wrong?***
  Eg, Could the user or somebody else be cut or stabbed by accident?
- ***How serious would it be if something did go wrong?***
- ***How can the risk(s) be controlled for this activity?***
  Eg, Can it be done safely? Does the procedure need to be altered?

Emergency action

- **Minor cuts** Rinse the wound with water. Get the casualty to apply a small, sterile dressing.
- **Severe cuts** Lower the casualty to the floor. Raise the wound as high as possible. If feasible, ask the casualty to apply pressure on or as close to the cut as possible, using fingers, a pad of cloth or, better, a sterile dressing (adding further layers as necessary). If the casualty is unable to do so, apply pressure yourself, protecting your skin and clothes from contamination by blood if possible. Leave any embedded large bodies and press around them. Send for a first aider.

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CLEAPSS STUDENT SAFETY SHEETS 10

Electricity

Situation	Hazard	Comment
Electric power distribution 230 V ac and above at high currents (over 5 mA).	 ELECTRIC SHOCK / BURN	*In non-school contexts*: over-head power lines and local sub-stations could cause accidents if children behave foolishly.
Home and school Above 28 V ac or 40 V dc and at currents over 5 mA. This includes the 230 V ac mains supply.	 ELECTRIC SHOCK / BURN	*In school science*: problems may arise from terminals of high voltage (high tension, HT) supplies or low-voltage units with an HT outlet (as some supply 150 mA); also in activities involving electrophoresis, model transformers or conductivity of molten glass. *In non-school contexts*: problems arise due to poor insulation (damaged wiring and plugs), incorrect wiring, over-loaded circuits, poor earthing or vandalism.
School science investigations Less than 28 V ac or 40 V dc and at currents over 5 mA. This includes almost all work with batteries in school or elsewhere.	LOW ELECTRICAL HAZARD  TOXIC / CORROSIVE	Most school circuit work, including electrolysis, is in this category (although problems could arise if currents over 10 A were used). Some cells, batteries and accumulators contain TOXIC or CORROSIVE materials.
Everywhere: eg, static electricity Any voltages at very low currents (well below 5 mA)	LOW HAZARD	Examples include the van de Graaff generator (but **not** induction coils which may give over 5 mA). Electronic equipment nearby may be damaged by static discharges or electromagnetic fields.

Typical control measures to reduce risk

- Use the lowest voltage possible (and, for electrolysis, the lowest current and concentration that gives good results).
- Avoid exposed conductors which are live above 28 V.
- Avoid the possibility of water coming into contact with conductors which are live above 28 V.
- Check that primary and secondary insulation (ie, both layers of plastic coating) are in good condition.
- Avoid over-loaded circuits, too many plugs in one socket, etc.
- Check that plugs are correctly wired with appropriate fuses.
- Ensure good earth connections where necessary.

Assessing the risks

- ***What are the details of the activity to be undertaken? What are the hazards?***
- ***What is the chance of something going wrong?***
  Eg, Accidentally touching a live component through poor design or poor maintenance.
- ***How serious would it be if something did go wrong?***
  Eg, Could a current flow through the heart? How large a voltage and/or current?
- ***How can the risk(s) be controlled for this activity?***
  Eg, Can it be done safely? Does the procedure need to be altered?

Emergency action

- **Electric shock** — **Take care for your own safety.**
  Break contact by switching off or removing the plug. If this is not possible, use a wooden broom handle or wear rubber gloves to pull the casualty clear. See a doctor.
  If the casualty is unconscious, check that airways are clear and that the casualty is breathing and has a pulse. If so, place the casualty in the 'recovery position'. If a pulse is found but the casualty is not breathing, artificial ventilation is necessary. If no pulse is found and the casualty is not breathing, cardio-pulmonary resuscitation is necessary.

CLEAPSS

STUDENT SAFETY SHEETS 97

Transferring (Handling) Solid Chemicals

Why 'transferring' and not 'handling'

It is better to use the word 'transferring' as opposed to 'handling' because 'handling', if taken literally, means 'using your fingers and hands'. Many chemicals are toxic, corrosive or irritant to the skin so directly 'handling' such chemicals is never a good idea.

Should I wear gloves?

The use of chemically resistant gloves should always be considered but wearing gloves reduces manual dexterity, gives rise to an environmental issue (because they do not degrade very quickly in the waste) and are expensive for the school. More importantly, if a chemical is on the gloves, the wearer may not realise it is there and so may wipe that chemical on other parts of the body (eg, eyes). However, if there are cuts which cannot be covered or other skin issues on the hand then gloves should be worn. For a small number of chemicals which are corrosive but do not immediately produce a sensation of burning (eg, phenol) they should also be worn.

Transferring solids

When transferring solid chemicals, the main risk is of spilling a hazardous solid.
A spatula is the correct tool for transferring solids from one container to another. Always check that the spatula is clean, and do not use the same spatula for different solids, unless cleaned in water and dried. Spatulas come in various shapes and sizes so beware of instructions that simply say "use a spatula-full".

Nuffield spatula
This is the most common spatula used by students in schools, about 14 cm long. But with either end available for use, care must be taken in being using the same end and to clean and dry the spatula before changing to another chemical. The 'curved' end is the most suitable to use.

Chattaway spatula
This is available in different sizes. Students should use the small size version, about 10 cm long; teachers and technicians may use larger versions, about 20 cm long, in the preparation of solutions. There are also micro-sized versions.

Trulla (trowel spatula) and ***Spoon Spatulas***
This is usually only used by technicians or teachers for transferring larger quantities of solids.

DIY spatula - use a wooden splint

If you have used a wooden splint to transfer one solid chemical, the end can then be cut off with scissors and another chemical can be transferred with the same splint. It can be cut to a point to transfer tiny amounts of solids.

Mixing solids

The solids to be mixed should each be placed on separate pieces of paper (or in plastic weighing boats) and the solids then poured gently from one onto the other, back and forth. Repeat the pouring action about 10 times so that there is thorough mixing. This is the only safe way of preparing explosive mixtures and is good practice for all solid mixtures.

CLEAPSS

STUDENT SAFETY SHEETS 98

Transferring (Handling) Liquid Chemicals

Why 'transferring' and not 'handling'

It is better to use the word 'transferring' as opposed to 'handling' because 'handling', if taken literally, means 'using your fingers and hands'. Many chemicals are toxic, corrosive or irritant to the skin so directly 'handling' such chemicals is never a good idea.

Should I wear gloves?

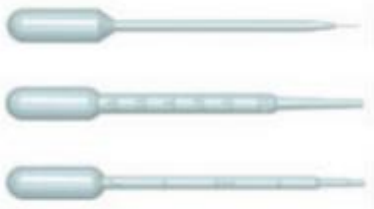
The use of chemically resistant gloves should always be considered but wearing gloves reduces manual dexterity, gives rise to an environmental issue (because they do not degrade very quickly in the waste) and are expensive for the school. More importantly, if a chemical is on the gloves, the wearer may not realise it is there and so may wipe that chemical on other parts of the body (eg, eyes). However, if there are cuts which cannot be covered or other skin issues on the hand then gloves should be worn. For a small number of chemicals which are corrosive but do not immediately produce a sensation of burning (eg, phenol) they should also be worn.

Transferring liquids

When transferring chemicals which are liquid, the main risk is of spilling or splashing a hazardous liquid or a hazardous aqueous solution.
Spills occur when people attempt to pour liquids from a large container (bottle) into a small container such as a test tube. There is a risk of liquids dribbling down the side of the bottle or measuring cylinders, possibly damaging labels, making the bottle unsafe to pick up for the unwary, or producing fumes in the store as the liquid evaporates. It is better to pour from large bottles into (labelled) beakers first.

Pouring from bottles, measuring cylinders and beakers
One way of avoiding dribbles is to pour down a glass rod into a container via a funnel.

Small volumes of liquid (up to 3 ml)
Use plastic teat pipettes or dropping bottles.



Using automatic or volumetric pipettes
More sophisticated pipettes are available for other purposes.

Mixing liquids

Stirring
Spatulas should not be used for stirring. Stirring rods made of glass or plastic should be used. Over enthusiastic stirring can cause a glass stirrer or container to break or the liquid to splash out. Some laboratories now have magnetic stirrers.

Filling a test tube

If using a test tube, do not fill it more than one-fifth full. To mix the contents, 'waggle' the test tube from side to side. Do not shake it up and down, especially not with a thumb over the end.

SMSC in Science

Spiritual

Science is using evidence to make sense of the world. It has the ability to make us feel both enormously insignificant (compared to the scale of the visible universe) and enormously significant (we are genetically unique). It helps us understand our relationship with the world around us (how the physical world behaves, the interdependence of all living things). Making new discoveries increases our sense of awe and wonder at the complexities of the natural world. For scientists, this is a spiritual experience and drives us onwards in our search for understanding.

Moral

Moral decisions are an important aspect of Science. Scientific discoveries and inventions need to be used responsibly, and decisions made based on evidence (not prejudice). Pupils realise that moral dilemmas are often involved in scientific developments. When considering the environment, the use of further natural resources and its effect on future generations is an important moral consideration.

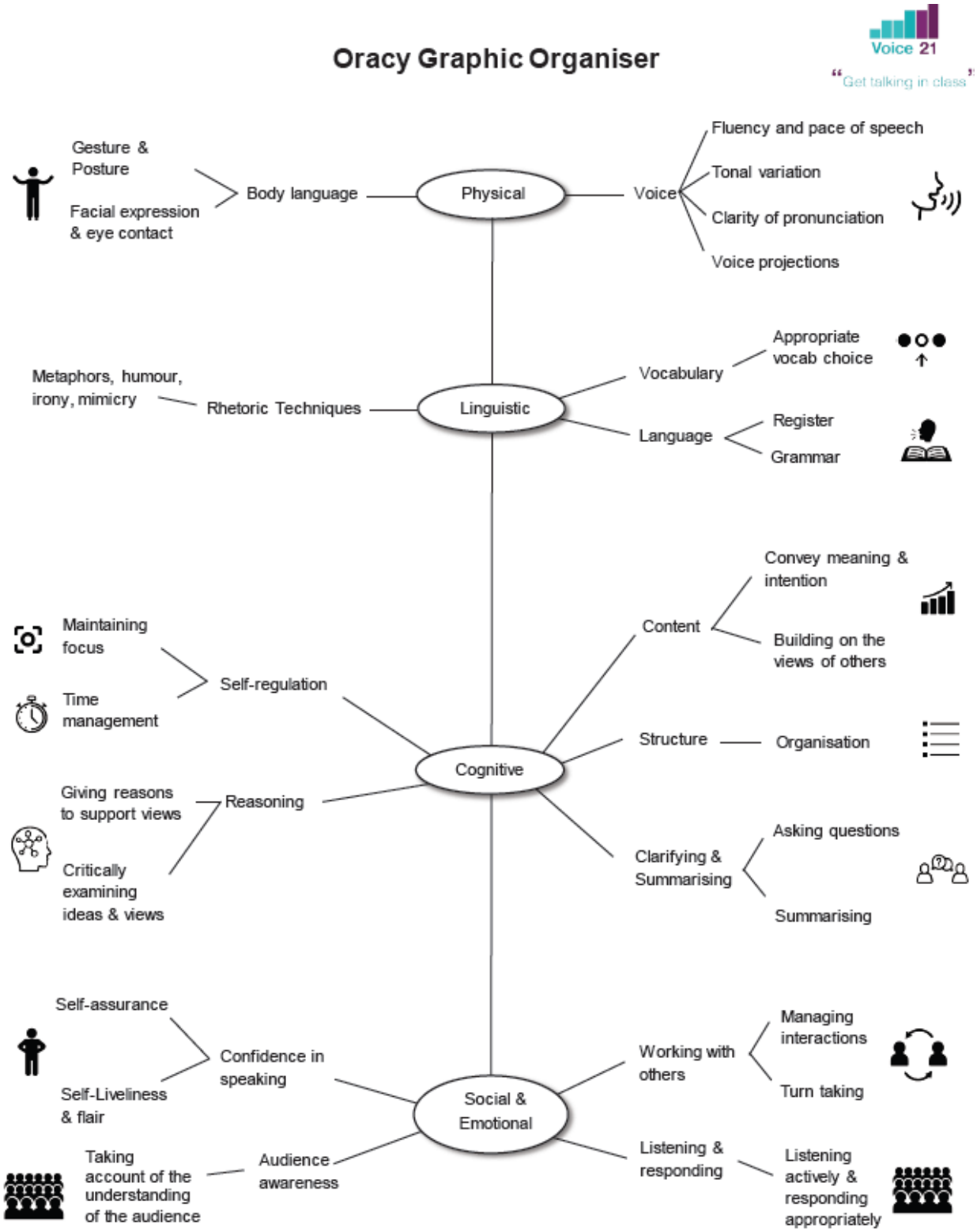
Social

At St Lawrence, science is about collaboration. Sharing ideas, data, and results (for further testing and development by others) is a key principle of the scientific method. We encourage pupils to work together on scientific investigations and to share results (to improve reliability). Science has a major impact on the quality of our lives. In Science lessons, pupils consider the social impact (both positive and negative) of science and technology.

Cultural

Science permeates modern culture and has played a key part in developing it. In Science lessons, we explore and celebrate research and developments that take place in many different cultures, both past and present. We explore how scientific discoveries have shaped the beliefs and cultures of the modern world.

Oracy in Science



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Sentence Stems for giving feedback

Praise: What have they done well?

Be Specific

Give an example

Why was it good?

- Because you have…
- Your work has had the effect of…
- You have improved how…
- I notice that you…
- This means that…
- When you… it made me…
- Your use of… in order to…
- I enjoyed the part where…
- The part where you… has had the effect of…

Enhance: What do they need to do to improve?

Be specific

Give an example

Why will it enhance their learning?

Checking for Understanding	Reshaping and Extending Learning
• Why did you choose to…? • Can you explain how…? • Prove to me how you came to this conclusion by using… • What effect did … have on …	• I've noticed that you haven't… • Can you prove…? • Could you have included…? • Where else could you use… in your learning? • In order to improve your learning, you need to…

Respond: Show that you understand

Read what you could have done better

Correct the mistake

Show how you now understand

- Thank you, I agree that…because…
- I can see why you've said that…
- I actually disagree with you because…
- I have now… the effect this has had is…
- Now that I've had time to reflect…
- I agree with your comment that… because…
- Now that you've pointed it out…
- You've helped me to understand…

Talking like a Scientist Sentence Stems

- It is…because…
- It will…because…
- *How do you know (e.g. 'The porridge is hot')?*

- I think this…because…
- I know this, so I think…
- This will happen because…
- *What do you think?*
- *What will happen if…?*

- I know that…. Therefore, I know that…
- Due to the fact that…, I know that…will happen.
- Maybe it's because…
- It is true that…
- Having analysed…, I believe that…
- I can prove how I know this because…

- Can we prove that…?
- In conclusion, I have found that…
- I would like to prove / disprove…
- Perhaps the reason is …
- Based on the evidence I have been presented with, I conclude…
- Taking everything into account…
- Having pondered…
- Given this, it is likely that…
- *If we accept this hypothesis, what else will be true?*

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Version	Date Issued	Issued by	Reason for Change	Presented To (initials to agree policy has been read and understood)	Approved by:	Date
0.1	May 2020	Claire Fitzpatrick	Review		Amory Charlesworth	May 2020
0.2	Dec 2022	Claire Fitzpatrick	Planning includes Hamilton and SMSC p5	Whole staff	Amory Charlesworth	Dec 2022
0.3	May 2024	Emily Renouf	Oracy in Science	Whole staff	Amory Charlesworth	May 24