

SCIENCE DEEP DIVE

INFORMATION FOR GOVERNORS and THE COMMUNITY



Intent: Why do we teach this? Why do we teach it in the way we do?

At Coberley we want our children to love science. We want them to have no limits to what their ambitions are and grow up wanting to be astronauts, forensic scientists, toxicologists or microbiologists. We want them to embody our core values.

The science curriculum has been carefully crafted to enable it to be exciting and challenging and work within the parameters of our class structure and the National Curriculum. We want to equip them with not only the minimum statutory requirements but to prepare them for the opportunities, responsibilities and experiences of later life. We want our children to remember their science lessons in our school, to cherish these memories and embrace the scientific opportunities they are presented with. We want to ensure that we teach an inclusive curriculum that allows children with SEND or who are disadvantaged have the same opportunities as everyone else. We also want to ensure the children learn about key scientists and key inventions internationally and within our county; thus providing a rich cultural capital.

We use the Trivium model to teach science These characteristics are:

- **Knowledge:** What scientific knowledge do the children need to know for each topic.
- **Dialectic:** What scientific skills and abilities are the children learning to think and work scientifically using a combination of practical work, discussion and debating and research.
- **Rhetoric:** Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.

RATIONALE

-
- Intent
 - Implementation
 - Teaching and learning
 - Assessment
 - EYFS
 - Monitoring
 - Example of practice
 - Impact

Are there clear Intent, Implementation, Impact statements that tell the story how science is delivered?

Science is explored using Developing Experts

Science is divided into three main areas:

- Biology
- Chemistry
- Physics

Medium Term Plans from Developing Experts

Year 1 Animals Including Humans - About Animals						
Scientific Enquiry Covered	Rocket Words Covered	Name of Task / Tasks	Resources Needed	National Curriculum Reference	Summa	
Identifying and classifying	Food, water, shelter, air, energy	Pass the Puppy. Group pets into animals you would need to keep outside and animals you would keep inside.	Pass the Puppy Toy dog/puppy Page 1 of Handout indoors or Outside? Page 2 of Handout Animal Adjectives	Describe and compare the structure and needs of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).	Which pet (leopard) top of the Where is right cat?	
Use observations and ideas to suggest answers to questions	bird, nest, build, mud, grass	Make a Bird Feeder.	Making a Bird Feeder Plastic bottle Wooden dowel / pencils Scissors, Push Pin, String Bird Seed, Lard / peanut butter / suet (optional) On The Menu, Selection of nuts and seeds, Weighing Scales	Early Years Framework for England: Understanding the world involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology, and the environment.	Birds build their nests these net	
Observing closely using simple equipment, using observations and ideas to suggest answers to	pet food, kennel, snail, ferret, iguana	Create a poster explaining all the different things you need to do and give your animals and pets	Animal Care Poster, Paper Coloured pens, images to cut and stick, scissors, glue, Fur Exploration, Handout, Making Dog Biscuits, Baking paper, Measuring bowl, Measuring	Describe and compare the structure and needs of a variety of common animals (fish, amphibians, reptiles, birds, and mammals, including pets).	Dogs own important	

	Class 1	Class 2		Year 4&5		Year 6	
		Year 1 (23-24)	Year 2 (22-23)	2023 -24	2022-23	Year 1 (2023-4)	Year 2 (2022-23)
Autumn	Seasonal changes (Y1) Everyday Materials (Y1)	Light (Y3)	Rocks & Fossils (Y3)	Food and Digestion (Y4) Forces (Y5)	Changes of material (Y5) Explore Life Cycles (Y5)	Animals Including Humans - The Heart and Health Evolution and Inheritance	Blood and transportation Light
Spring	Seasonal changes Everyday Materials (Y1) Animals Including Humans (Y1)	Materials (Y2)	Forces & Magnets (Y3) Healthy Eating (Y2)	Classifying living things and their Habitat (Y4) Sound (Y4)	Living things their habitats (Y5) Properties of material (Y5)	Forces	Electricity

Long Term Plans on the web site

CURRICULUM PLAN

How do you know we have full National Curriculum Coverage?

Teaching - Using Developing Experts



Scientific Enquiry

- Questioning by children
- Skills identified in lesson plans
- Open ended practical
- Assessed using Insight

Knowledge

- Assessed by DE knowledge quiz
- Also recorded in Insight
- Key information on lesson plan and shown in presentation

Vocabulary

- Assessed by DE Rocket Words quiz
- Also recorded in classroom wall
- Definition provided and discussed

Reporting

- Variety of forms including experiment write, extended writing, data and tables, targeted questions
- Assessed using Insight



Coberley C of E Primary School

Science Milestones

Every Child, Every Chance, Every Day



Class 1	Class 2	Class 3
To Work Scientifically		
• Ask simple questions. • Observe closely, using simple equipment. • Perform simple tests. • Identify and classify. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions.	• Ask relevant questions. • Set up simple, practical enquiries and comparative and fair tests. • Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. • Gather, record, classify and present data in a variety of ways to help in answering questions. • Record findings using simple scientific language, drawings, labelled diagrams, 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 and suggest improvements, new questions and predictions for setting up further tests. • Identify differences, similarities or changes related to simple, scientific ideas and processes. • Use straightforward, scientific evidence to answer questions or to support their findings.	• Plan enquiries, including recognising and controlling variables where necessary. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations. • Use test results to make predictions to set up further comparative and fair tests. • Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.
Biology		
To Understand Plants • Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. • Identify and describe the basic structure of a plant.	To Understand Plants • Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they use them.	To Understand Plants • Relate knowledge of plants to studies of evolution and inheritance. • Relate knowledge of plants to studies of all living things.

What does a Year 4 scientist look like?

Scientists can

- Set up simple practical enquiries, comparative and fair tests.
- Know scientific vocabulary and key facts relating to world around them with particular reference to biology, physics and chemistry

Scientists work scientifically by

- Asking relevant questions and using different types of scientific enquires to answer them.
- Identifying differences, similarities or changes related to simple scientific ideas and processes.
- Making systematic and careful observations and, where appropriate taking accurate measurements using standard units, using a range of equipment.

Scientists record and share ideas by

- Recording findings using simple scientific language and presenting data in a variety of ways.
- Reporting and presenting findings from enquiries, including conclusions and explanations of results, in oral and written forms such as a display or presentation.



Progression Map for children

PROGRESSION

How do we know children make progress in science year on year?

⌵ Y6 Objectives	⌵												
Average Depth	⌵		2.3	1.7	2.3	2.0	2.0	1.7	2.3	1.7	2.0	1.7	2.3
% Secure	⌵		50%	33%	50%	50%	50%	33%	50%	33%	50%	33%	50%
Blood and Transportation													
☐ Knowledge: Scientific Knowledge	⌵												
☐ Dialectic: Enquiry and Investigation	⌵												
☐ Rhetoric: Scientific collection, interpretation and communication	⌵												
Light													

Insight Records (Teacher Assessed)

- Knowledge
- Dialectic: Scientific Enquiry
- Rhetoric: Reporting

Based on AREs

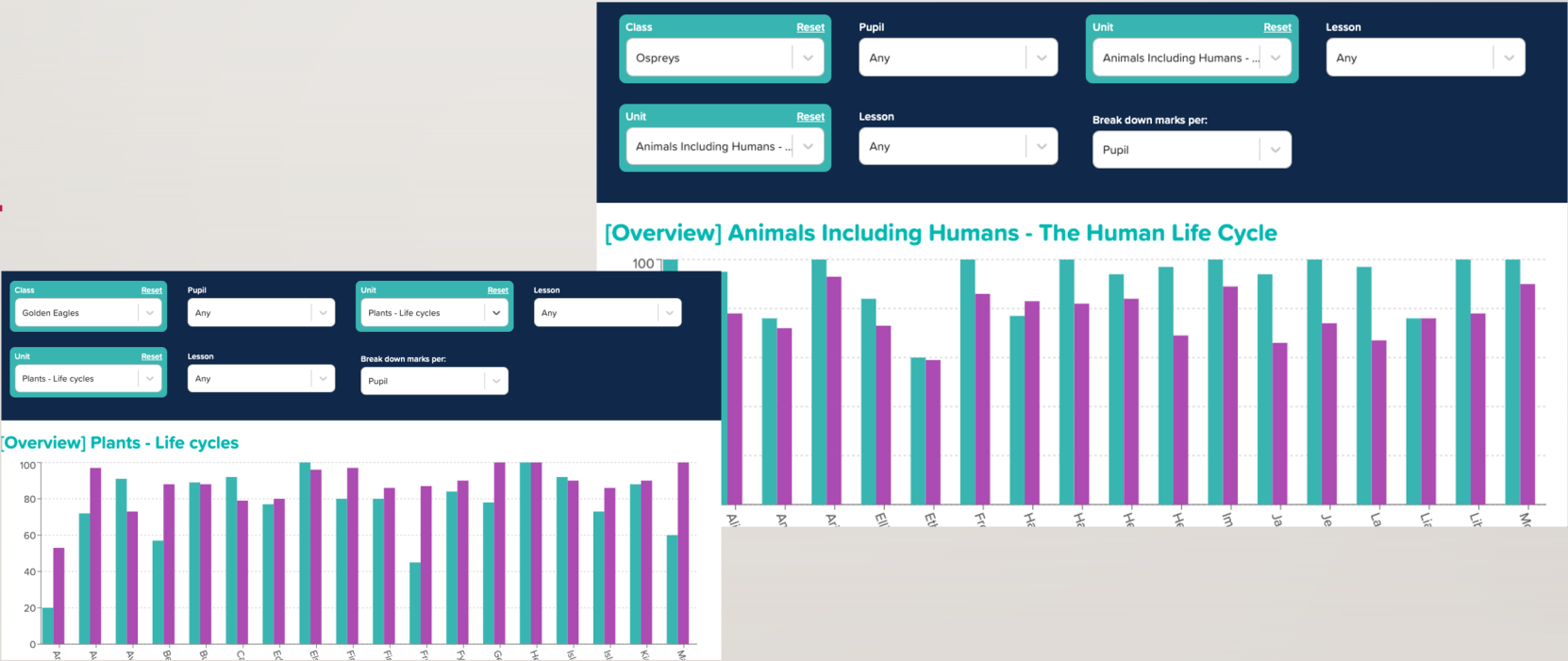
ASSESSMENT DATA

Developing Experts record data for each topic

Green: Rocket Words

Purple: Assessment Quiz

What does the data show?



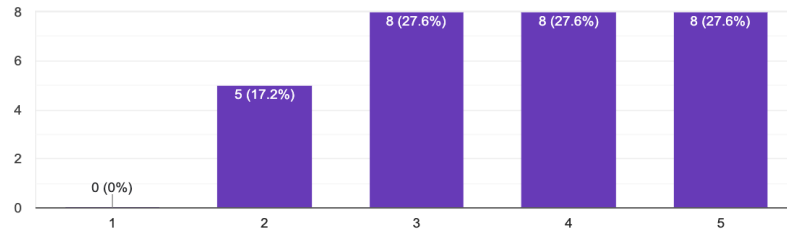
STAFF TRAINING – NOVEMBER 2021, Andrew Milner



What was the impact of this training?

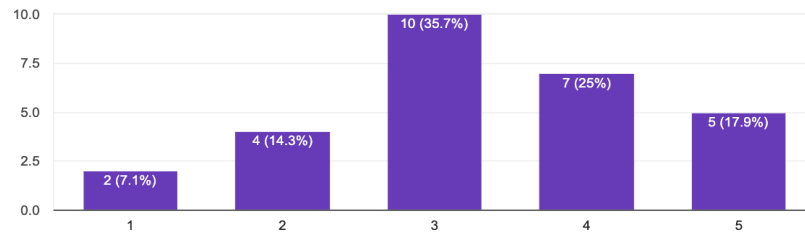
Science lessons make me think

29 responses



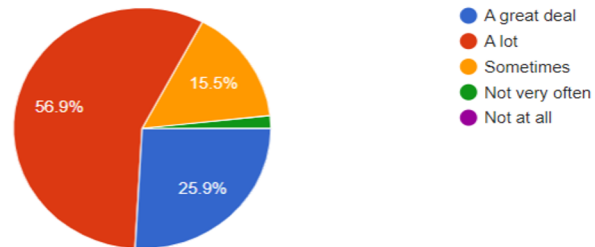
I understand everything in my science lessons

28 responses



Do you have opportunities for extended writing in Science?

58 responses



Science pupil voice

Form description

Are you interested in Science lessons?

☐ Extremely interested

☐ Very interested

☐ Somewhat interested

☐ Not at all interested

Do you complete practical work in Science lessons? *

☐ Very often

PUPIL VOICE

This information gave valuable information regarding how the children felt about science, including opportunities, practical nature.

This information feeds into the action plan to drive science forward

What did this show? How are we going to react to this information?

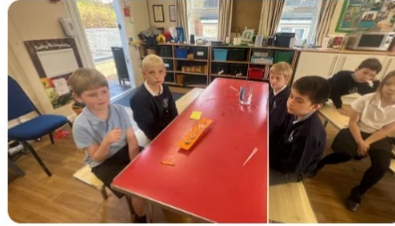
MONITORING

BOOK LOOKS, LESSON
OBSERVATIONS AND
RESOURCES - This shows our
Science Padlet

Nov 2022: Separating Y4/5



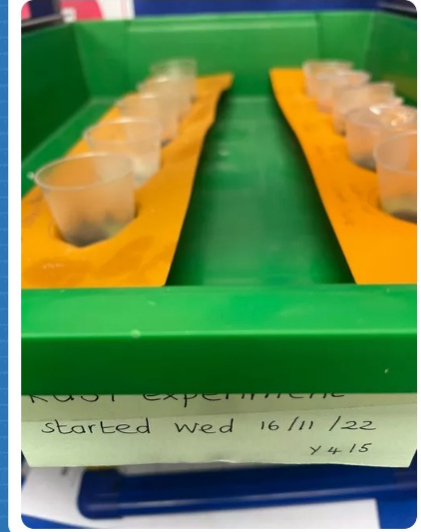
Oct 2022 - Sorting
Materials Y4/5



Oct 2022 - Bacteria Y6



Nov 2022 - Creating Rust
(Y4/5)



April 2022 - Making our own
versions of a heliocentric
orbit.



May 2022 - In science
today, we discussed how the
Earth moves through space
and how this can affect the
seasons in different
countries.



Class 2: Materials



Creating Stonehenge from corn flour
and wu liquid at home

Class 3 Boat Experiment,
Feb 2022



Which boat will hold the most weights?

Class 2's Making Materials



Working Scientifically

Has this produced a consistent approach to teaching and work produced? Is the subject well resourced?

TRIPS AND ENRICHMENT

- How do trips and enrichment activities have an impact on the curriculum?



We the Curious

Boat building

INFORMATION ON SCHOOL WEBSITE

Is this information easy to understand for parents?

Science



Science Rationale

At Coberley we want our children to love science. We want them to have no limits to what their ambitions are and grow up wanting to be astronauts, forensic scientists, toxicologists or microbiologists. We want them to embody our core values. The science curriculum has been carefully crafted to enable to be exciting and challenging and work within the parameters of our class structure and the National Curriculum. We want our children to remember their science lessons in our school, to cherish these memories and embrace the scientific opportunities they are presented with!

Science Rationale

[docx 126KB]

Coberley C of E Primary School

Science Curriculum Map

Every Child Every Chance Every Day

	Year 1 (2023)		Year 2 (2024)		Year 3 (2025)		Year 4 (2026)		Year 5 (2027)		Year 6 (2028)	
	Science Curriculum Map											
Autumn	Animals including humans (plants, insects, etc.)	Weather	Light	Soils & Plants	Animals	Electricity	Acids & Bases	Sound	Space	Human Body	Plants	Weather
	Science Curriculum Map											
Spring	Animals including humans (plants, insects, etc.)	Weather	Light	Soils & Plants	Animals	Electricity	Acids & Bases	Sound	Space	Human Body	Plants	Weather
	Science Curriculum Map											
Summer	Animals including humans (plants, insects, etc.)	Weather	Light	Soils & Plants	Animals	Electricity	Acids & Bases	Sound	Space	Human Body	Plants	Weather

Science Curriculum Map

Science Curriculum Map [docx 227KB]

Coberley C of E Primary School What does a Coberley Scientist look like? Every Child Every Chance Every Day											
All Coberley scientists will be:											
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Curious	Curious	Curious	Curious	Curious	Curious	Curious	Curious	Curious	Curious	Curious	Curious
Observant	Observant	Observant	Observant	Observant	Observant	Observant	Observant	Observant	Observant	Observant	Observant
Communicative	Communicative	Communicative	Communicative	Communicative	Communicative	Communicative	Communicative	Communicative	Communicative	Communicative	Communicative
Teamwork	Teamwork	Teamwork	Teamwork	Teamwork	Teamwork	Teamwork	Teamwork	Teamwork	Teamwork	Teamwork	Teamwork
Resilient	Resilient	Resilient	Resilient	Resilient	Resilient	Resilient	Resilient	Resilient	Resilient	Resilient	Resilient
Safe	Safe	Safe	Safe	Safe	Safe	Safe	Safe	Safe	Safe	Safe	Safe

What does a Coberley Scientist look like?

Progression of Knowledge [pdf 179KB]
 Characteristics of a Scientist2 [docx 152KB]

Coberley C of E Primary School

Science Curriculum Milestones

Every Child Every Chance Every Day

	Year 1 (2023)	Year 2 (2024)	Year 3 (2025)	Year 4 (2026)	Year 5 (2027)	Year 6 (2028)
Autumn	- Life and living organisms: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - Plants: Plants and animals - 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Science Curriculum Milestones

Science Curriculum Milestones [docx 112KB]
 Science National Curriculum [pdf 90KB]



Developing Experts

We use Developing Experts throughout the their tablets or a computer at home and

ACTION PLANS & NARRATIVE

Does this tell the journey of science and where we want to go next?



Coberley C of E Primary School

Coberley Action Plan

Every Child, Every Chance, Every Day



Current Situation: Following a successful government bid and collaboration project we taught Class 3 in Rendcomb colleges science lab for 12 sessions using specialist resources. This re-ignited our science focus on investigative skills and enabled us to create a science lab in the school hall. The focus has been on the Trivium elements of knowledge, dialectic and rhetoric skills and these have underpinned our teaching, learning and assessment. In September 2021 we began to use Developing Experts, an online science scheme in conjunction with Birdlip

Objective	Details / Description	Responsibility	Resources / Monitoring	Impact
Resources 1. Existing Resources 2. Identify and fill gaps 3. Plan to alter the hall into a science lab	1. Audit current resources 2. Create a wish list including storage facilities 3. Create a plan to make the hall an exciting science space. 4. Ensure Hall is well resourced and labelled.	AM	£300 for resources	Resourcing plan, raise the profile of science
Training 1. Regular SAS training 2. Collaboration with Rendcomb science staff	1. Regular SAS courses and staff feedback. 2. Collaboration to include shared ideas, resources and teaching.	AM	Time / feedback from courses	Consistent teaching approach
Curriculum 1. Evaluate curriculum map 2. Evaluate milestones 3. Stem opportunities 4. Science vocabulary	1. Ensure curriculum map has full NC coverage and is distributed on a rolling plan across the 3 classes. 2. Ensure science milestones are accurate and implemented in the curriculum. 3. Explore opportunities to use STEM other than K'nex challenge. 4. Create a vocabulary checklist for each science topic	AM	Use of INSIGHT, plans on website	Clear understanding of key skills, curriculum content and progression throughout year groups.

Science Narrative 2020-25

Example Key Objectives (from action plan)	Priority
- A clear curriculum plan which adheres to National Curriculum - Systems to monitor pupil progress - Pupil voice to monitor pupil's views on Science at school - Focus on Scientific vocabulary - Staff training	HIGH HIGH HIGH MED HIGH

Date	Narrative	Impact
9/20	Creation of curriculum plan based on the NC. Ensure coverage and split over KS1/KS2 carefully	Ensure we are compliant
12/20	Science Leader investigated new schemes with a focus on scientific vocabulary tied to the national curriculum - Developing Experts trialed in Class 3. Vocabulary is explicitly taught every session and is a way to activate prior knowledge in Science lessons - Science vocabulary wall created as a class display.	Coherent curriculum which follows national curriculum followed - vocabulary gap addressed every lesson.
1/21	The Science Curriculum design is based on a two year rolling program - this means that topics are studied sequentially in consecutive years. Forest school and PE are also used to backfill any lost knowledge from the pandemic to ensure complete coverage and activation of prior knowledge (e.g. Evolution is an outlier in that it is only in the national curriculum in Year 6)	Impact of the pandemic is lessened - any "missed" topics are addressed
2/21	After successful trial of Developing Experts in Class 3 scheme rolled out to the rest of KS2 with a view to rolling out fully in KS1 in September.	Vocabulary gap closing
4/21	Revision of science rationale based on school template	provides a clear vision of what we do and what we want to do

Presentation to Gloucestershire Secondary School Leads and GCC

Showing secondary schools leads the level of Science taught in Primary Schools (June 2021)

This is where we were...

- Science taught by class teacher based on class topics e.g. Dinosaurs = rocks and fossils
- Science work in topics books
- Lack of pedagogy and science training
- Science focused on knowledge rather than scientific enquiry
- No links to other schools / organisations



Plotting the journey



This is now!

- ▶ Clear sequential curriculum plan.
- ▶ Clear progression maps
- ▶ Relevant subject rationales
- ▶ Action plans
- ▶ Clear assessments highlighting all key groups
- ▶ Good level of staff subject knowledge
- ▶ Monitoring, book looks, lesson obs and evidence on Padlets
- ▶ Pupil involvement
- ▶ Designated weekly science slot



OFSTED DEEP DIVE

- **What do deep dive OFSTED inspections look like for science?**
- Exploration of medium/long term plans for **science**.
- Meetings with **science** leader(s)
- Observations/Learning Walks (often with the **science** leader).
- Work scrutiny.
- Meetings with teachers teaching **science**.
- Meetings with children about their learning in **science**.

How would our science approach look to an inspection?

