Science at Fender

Intent

At Fender, we are committed to delivering a high-quality Science education that fully aligns with the National Curriculum. Our aim is for all pupils to develop a deep scientific knowledge and conceptual understanding while also learning about the nature, processes and methods of science through a variety of inquiry-based approaches. We ensure that children are equipped with the scientific knowledge and skills they need to understand the uses and implications of science in their everyday lives, both now and in the future. Our curriculum is designed to spark curiosity, foster a love of learning, and build pupils' confidence in asking questions, predicting outcomes, carrying out investigations, and drawing conclusions.

We ensure our Science curriculum is inclusive and accessible for every learner. Lessons are adapted to meet the needs of pupils with SEND, EAL and other additional needs, using practical learning, clear scaffolding and targeted support to remove barriers and promote equity. We represent a diverse range of scientists to reflect the backgrounds and experiences of our pupils, helping them to see themselves as scientists. Vocabulary is taught explicitly and used consistently to develop scientific literacy and confidence. Through meaningful, real-life contexts and cross-curricular links, our children learn that science is relevant, purposeful and empowering. By the end of primary school, all pupils leave with the curiosity, knowledge and enquiry skills needed to thrive in science and beyond.

Implementation

Our pedagogy is built around three key concepts:

1. Command of the Content / Excellent Subject Knowledge
2. Consistent Environment, Relationships and Routines
3. Cornerstones of Teaching & Learning (outlined beneath)

Core Knowledge	Oracy Rich Opportunities	Adaptive Practice
The core knowledge for each lesson is clear and explicit. This learning is broken down into clear steps.	Oracy elevates learning and offers the opportunity to promote disciplinary talk. Oracy is a feature of every lesson and is the outcome of at least one lesson per unit.	Learning is adapted carefully to meet the needs of all learners regardless of need or starting point.
Diverse & High-Quality Texts	**Vocabulary**	**Revision & Assessment**
Our curriculum is underpinned by diverse and high-quality texts that allow themselves to see themselves and others.	Vocabulary is explicitly taught and revised. This builds a bank of disciplinary vocabulary that is revised regularly	Assessment is ongoing and purposeful. Each lesson begins with a review of last week's learning. Each unit ends with a summative assessment.
Careers	**Modelling**	**CPD**

Real life opportunities are woven into the curriculum including visits, trips and opportunities to look at careers within the subject. At our annual Careers' Festival, the subject is represented by professionals.	Modelling is one of our true cornerstones of teaching and learning. Whatever the task, high-quality modelling helps unlock student understanding.	Ongoing CPD for subject leaders, teachers and teaching assistants ensures fidelity to our pedagogy.
Cultural Capital	Parental Involvement	Monitoring
Children learn about significant events, people and places that bolster their knowledge of the world. This is supported through visitors, trips and visits, and strengthened through our careful curation of high-quality and diverse texts.	Parents are invited to share in the learning journey through our engaging road maps. Learning is shared routinely on Class Dojo. Parents are invited in for special occasions, events and celebrations.	Subjects are monitored routinely through book looks, learning walks, pupil voice and governor visits

Impact
Through our inclusive and engaging Science curriculum, all pupils develop secure scientific knowledge, the ability to think critically, and the confidence to ask questions and explore the world around them. Children leave our school as curious, resilient learners who can work scientifically, use accurate vocabulary, and apply their understanding to real-life contexts. Our approach ensures that all learners, regardless of background or need, make good progress and are well-prepared for the next stage of their education.

Science Long-Term Plan							
Concepts							
	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	Me and My Small World Night and Day	The Human Body	Animals' Needs for Survival Humans	Skeletons Nutrition & Diet	Group & Classify Living Things States of Matter	Forces	Living Things & Their Habitats
Autumn 2	Changes in Winter What's Changed?	Materials	Materials	Nutrition & Diet Rocks	States of Matter	Space	Electricity
Spring 1	Let It Flow Happy & Healthy	Animals	Plants (Light & Dark) Living Things & Their Habitats	Fossils Soils	Sound	Properties of Materials Animals inc Humans	Light
Spring 2	Our Wonderful World From City to Sea	Caring for the Planet	Living Things & Their Habitats	Light	Electricity	Animals inc Humans Life Cycles	The Circulatory System Diet, Drugs & Lifestyle
Summer 1	Pushes & Pulls Watch It Grow	Plants	Plants (bulbs and seeds) Growing Up	Plants A	Habitats The Digestive System	Reproduction A Reversible & Irreversible Changes	Variation Adaptations
Summer 2	Let's Go Outside Animal Detectives	Growing & Cooking	Growing Up Wildlife	Forces Magnets	The Digestive System Food Chains	Sustainability Reproduction B	Fossils Themed Projects

FENDER PRIMARY SCHOOL

Long Term Plan - Science

F2

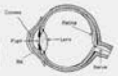
A1: Me & My Small World / Night & Day
A2: Changes in Winter / What's Changed?
Sp1: Let It Flow / Happy & Healthy
Sp2: Our Wonderful World / From City to Sea
S1: Pushes & Pulls / Watch It Grow
S2: Let's Go Outside / Animal Detectives

YEAR 1

A1: The Human Body
A2:Materials
Sp1: Animals
Sp2: Caring for the Planet
S1: Plants
S2: Growing & Cooking

YEAR 2

A1: Animals' Needs for Survival / Humans
A2: Materials
Sp1: Plants (Light & Dark)
Living Things & Their Habitats
Sp2: Living Things & Their Habitats
S1: Plants (bulbs and seeds)
Growing Up
S2: Growing Up
Wildlife



YEAR 3

A1: Skeletons
Nutrition & Diet
A2: Nutrition & Diet
Rocks
Sp1: Fossils
Soils
Sp2: Light
S1: Plants A
S2: Forces
Magnets

YEAR 4

A1: Grouping & Classifying Living Things
States of Matter
A2: States of Matter
Sp1: Sound
Sp2: Electricity
S1: Habitats
The Digestive System
S2: The Digestive System
Food Chains

YEAR 5

A1: Forces
A2: Space
Sp1: Properties of Materials
Animals including Humans
Sp2: Animals including Humans
Life Cycles
S1: Reproduction A
Reversible and Irreversible Changes
S2: Sustainability
Reproduction B

YEAR 6

A1: Living Things & Their Habitats
A2: Electricity
Sp1: Light
Sp2: The Circulatory System
Diet, Drugs & Lifestyle
S1: Variation & Adaptations
Evolution & Inheritance
S2: Fossils
Themed Projects

Careers

Careers education is a key part of our Science curriculum. Every lesson, the children are exposed to a new scientific career.

Oracy

Oracy skills are embedded throughout the Science curriculum - children are given opportunities to plan, predict, evaluate and compare.

Progression Map							
	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Science Progression						

Core Knowledge Tracker							
	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn	Science Core Knowledge Tracker						
Spring							
Summer							
Vocabulary							
	plant, grow, leaf, root, petal, tree, light, dark, float, sink, hot, cold, push, pull, fast, slow, day, night, change, ice, melt, rain, sun,	body, head, leg, arm, senses, hear, see, touch, smell, taste, material, wood, plastic, metal, soft, hard, smooth, rough,	alive, dead, never, habitat, microhabitat, food, air, water, exercise, hygiene, germ, offspring, adult, life cycle, seed,	nutrition, skeleton, muscle, joint, function, support, movement, rocks, fossil, soil, type,	teeth, incisor, molar, canine, digestion, stomach, intestine, predator, prey, producer, food chain, circuit,	gestation, reproduction, puberty, fertilisation, species, metamorphosis, compare, classify,	inherit, variation, adaptation, evolution, fossil, theory, microorganism, circulatory, heart, lungs,

	wind, care, safe, smell, taste, sound, hear, see, touch, weather, season, animal, baby	waterproof, absorbent, day, night, sun, moon, star, shadow, light, season, spring, summer, autumn, winter, weather, change	bulb, grow, plant, stem, root, leaf, compare, group, property, rigid, bendy, transparent, opaque, twist, squash, suitability	property, particle, state, solid, liquid, gas, freeze, melt, evaporate, condense, light, reflect, shadow, opaque, magnet, magnetic, attract, repel, force	current, battery, wire, bulb, switch, insulator, conductor, sound, vibrate, volume, pitch, ear, classify, environment, key, temperature, adapt	property, dissolve, solution, mixture, reversible, irreversible, filter, sieve, gravity, friction, air resistance, water resistance, mechanism, lever, pulley, gear, orbit, rotate, axis, solar system, planet, moon	oxygen, carbon dioxide, blood, artery, vein, nutrient, water, electricity, voltage, component, symbol, diagram, light, reflection, refraction, prism, spectrum, shadow, classify, taxonomy

Science - National Curriculum

Purpose of study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

The national 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
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

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 should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

School curriculum

The programmes of study for science are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage if appropriate. All schools are also required to set out their school curriculum for science on a year-by-year basis and make this information available online.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Science Lesson Structure
Revision & Recap Teacher revisits learning from last week, last term and last year. Absent children from the previous week/lesson find out the core learning from last week.
Vocabulary / Oracy Vocabulary is explicitly taught using oracy-rich strategies.
Explicit Teaching of New Knowledge Teacher uses the road map to place new learning in the context of the unit. Teacher uses core principles of our Fender Pedagogy to teach new core knowledge from that week.
Independence Children practice and develop their knowledge, through application of a historical skill in their independent (or group) work. This could be written or orally recorded, dependent on the knowledge, skill and task of that lesson.
Review…Revise…Reflect…Where Next? Teacher to make explicit the core knowledge from that lesson - three core facts! Revise that lesson's taught vocabulary Use the road map to look ahead - where does this knowledge take us next?

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Science Reading Spine</td></tr>
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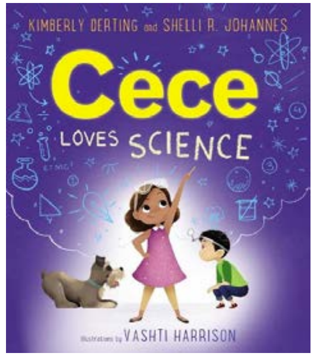

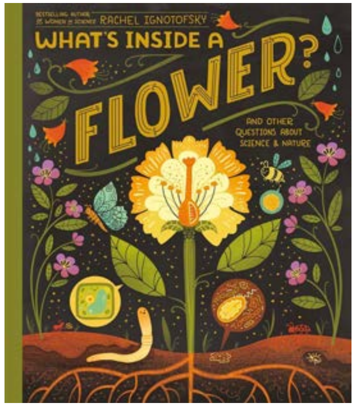

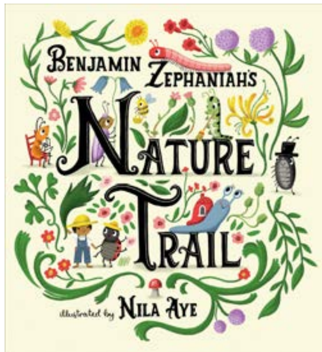

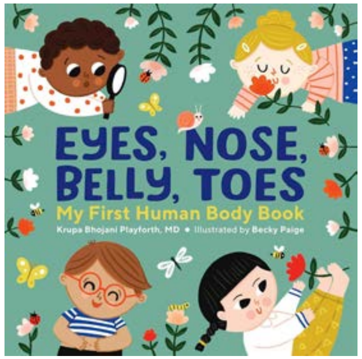

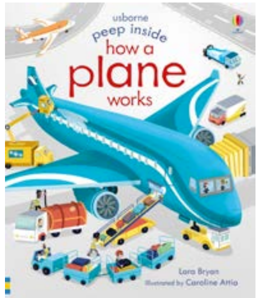

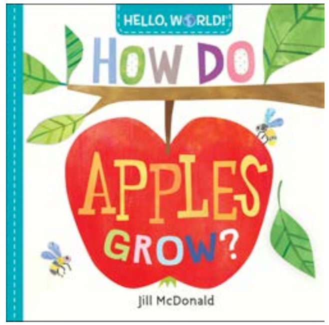

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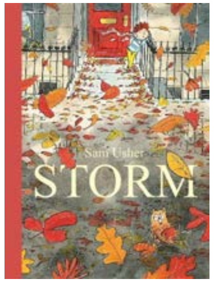
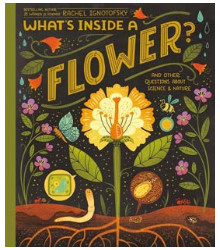
Year 1

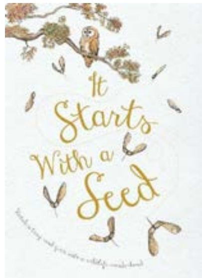

Sam Usher
STORM

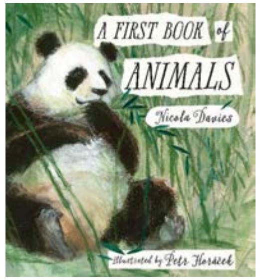

Little People, BIG DREAMS
Marie Curie

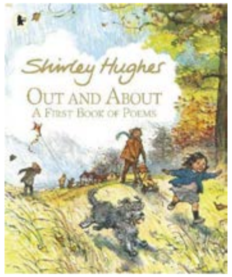

YUVAL ZOMMER
THE BIG BOOK OF BUGS


WHAT'S INSIDE A FLOWER?

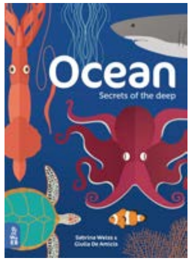

The Tree Lady

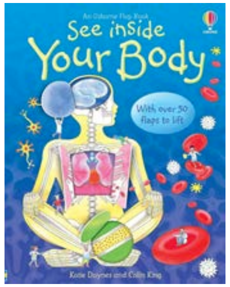

It Starts With a Seed


A FIRST BOOK of ANIMALS
Nicola Davies

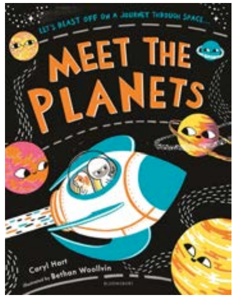

Shirley Hughes
Out and About
A First Book of Poems


SEASONS


Ocean
Secrets of the deep

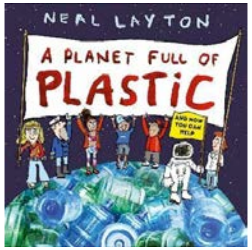

See inside Your Body
With over 50 flaps to lift

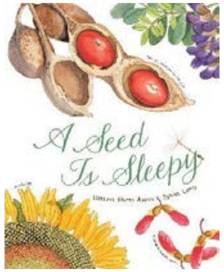

THE SKIES ABOVE MY EYES

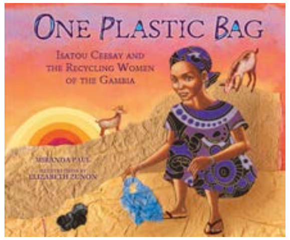

MEET THE PLANETS

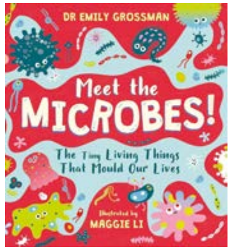
Year 2


SANDRA DIECKMANN
Leaf


NEAL LAYTON
A PLANET FULL OF PLASTIC


A Seed Is Sleepy


ONE PLASTIC BAG
Isatou Ceesay and the Recycling Women of the Gambia

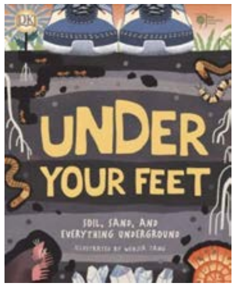

DR EMILY GROSSMAN
Meet the MICROBES!
The Tiny Living Things That Mould Our Lives
MAGGIE LI


Plants Can't Sit Still
REBECCA E. HIRSCH
MIA POSADA

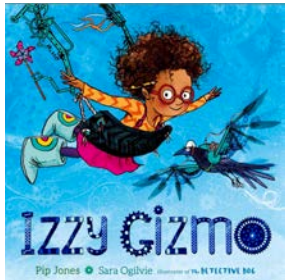

YUVAL ZOMMER
THE BIG BOOK OF THE BLUE


THE WATCHER


GRETA AND THE GIANTS
ZOE TUCKER
ZOE PERSICO


UNDER YOUR FEET


The Bug Collector
Alex G Griffiths


Izzy Gizmo
Pip Jones
Sara Ogilvie

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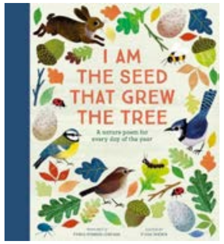

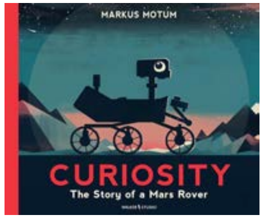

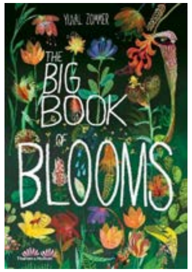

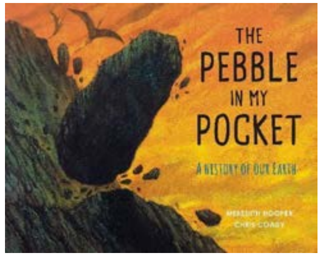

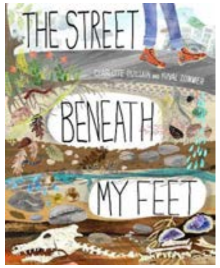

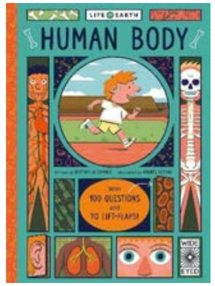

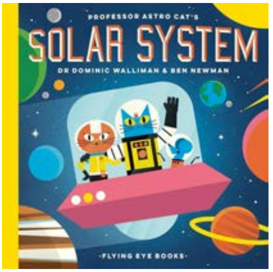

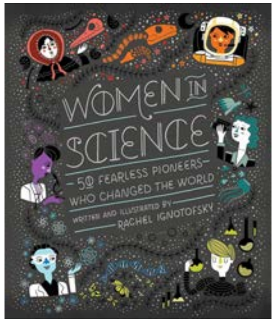

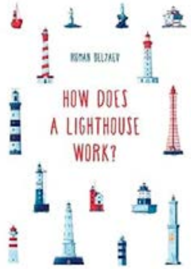

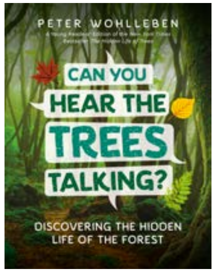

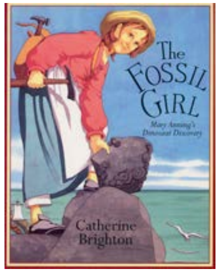

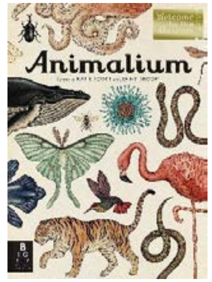

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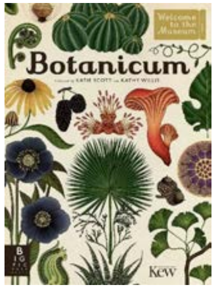

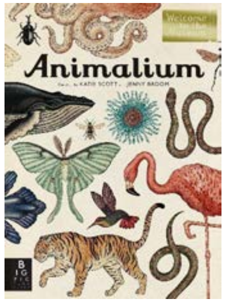

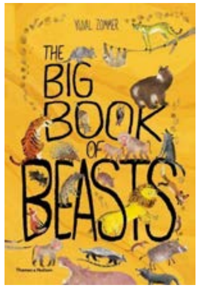

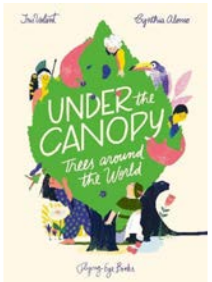

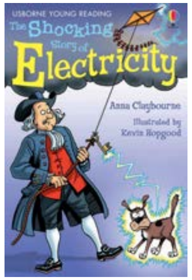

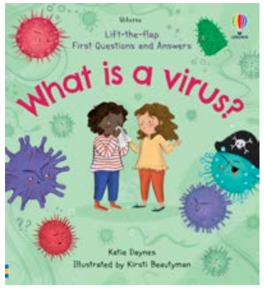

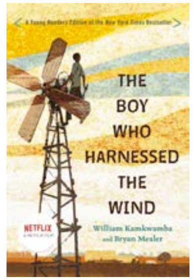

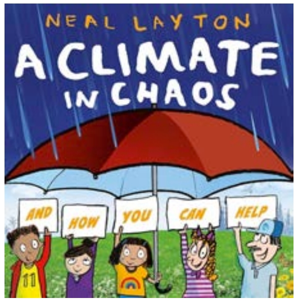

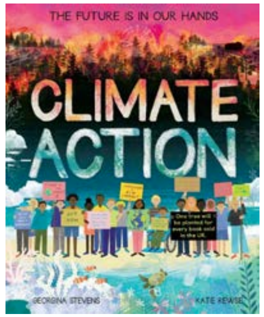

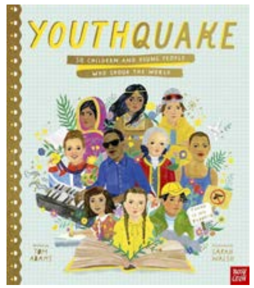

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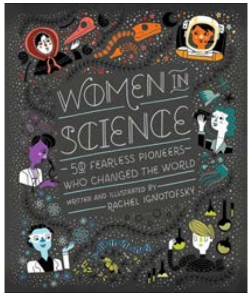
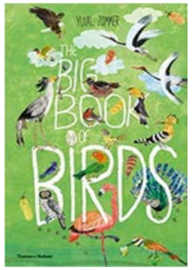
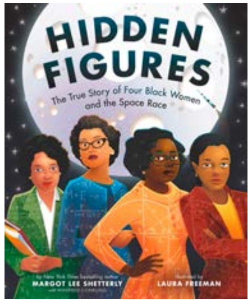
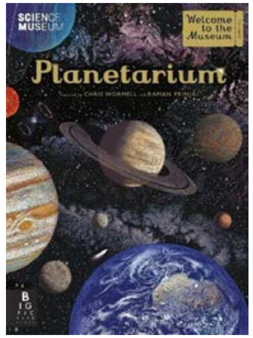
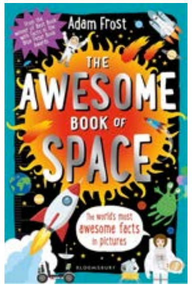
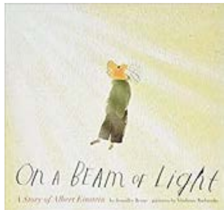
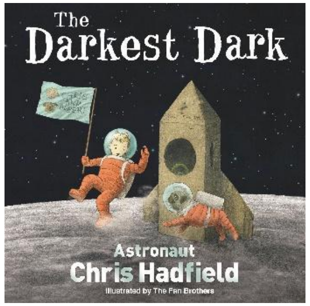
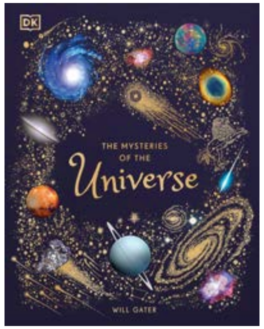
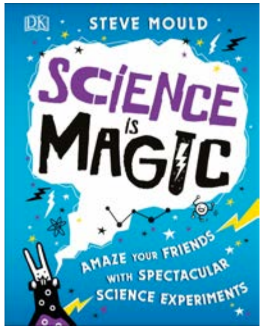
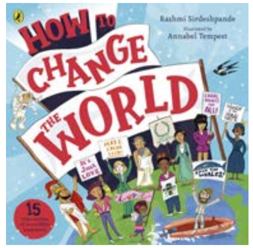
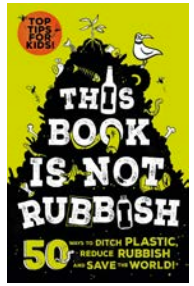
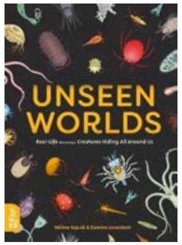
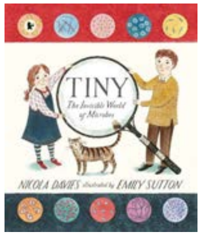
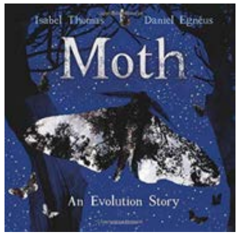
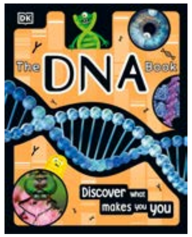
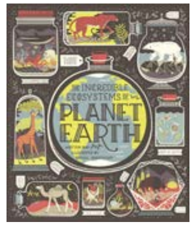
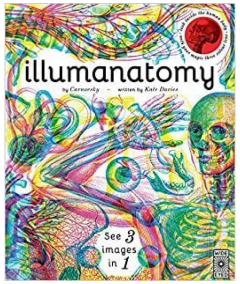
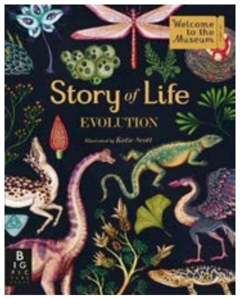
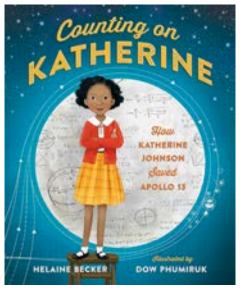
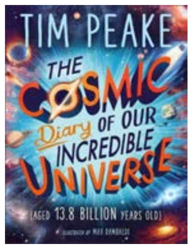
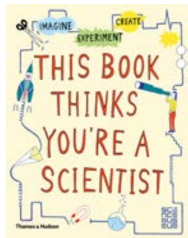
Year 5	            
Year 6	               

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