Year 6 Curriculum Term 4

Topic Title: Scream Machine	
English	**Maths**
Reading – 'The London Eye Mystery' by Siobhan O'Dowd In the upcoming term, the focus of our Reading lessons will revolve around the poem 'The London Eye Mystery' by Siobhan O'Dowd . Through our Whole Class Guided Reading sessions, we will delve into various aspects of the text to enhance our students' literacy skills. Whole Class Guided Reading Schedule: Lesson 1 (Vocabulary / General Knowledge): This session will concentrate on expanding the students' vocabulary and reinforcing their understanding of key concepts within the text. Lesson 2 (Just Read): Students will engage in independent reading of the assigned passages, fostering a love for literature and encouraging personal interpretation. Lesson 3 (Close Read): Through a detailed analysis of select passages, students will develop a deeper comprehension of the text's themes and characters. Lesson 4 (Comprehension): This session will focus on honing the students' ability to comprehend and articulate the events and messages conveyed in the novel. Lesson 5 (Library Visit): To nurture a love of reading beyond the classroom, students will have the opportunity to explore the school library and choose books of personal interest. By following this structured reading programme, we aim to cultivate a generation of enthusiastic and proficient readers.	**Number: Fractions, Decimals and Percentages** **1. Decimal and Fraction Equivalents** • Convert between simple fractions and their decimal equivalents (e.g. (1/4 = 0.25), (3/5 = 0.6). • Understand that some fractions have recurring decimal equivalents (e.g. (1/3 = 0.333…). • Use knowledge of place value to express fractions as decimals up to three decimal places. **2. Fractions as Division** • Recognise that a fraction represents division (e.g. (3/4) means 3 ÷ 4). • Solve division problems where the answer is presented as a fraction. • Interpret fractions in real-life contexts, such as sharing amounts equally. **3. Understand Percentages** • Recognise that percentages are fractions out of 100. • Express percentages as fractions and decimals (e.g. 50% = (50/100) = 0.5). • Understand percentages as a comparison of a part to a whole. **4. Fractions to Percentages** • Convert fractions into percentages using equivalent fractions (e.g. (3/4 = 75\%). • Convert fractions with denominators of 2, 4, 5, 10, 20, 25, 50, and 100 into percentages fluently. • Apply knowledge of division to find percentages from non-standard fractions.

Courage **Resilience** **Honesty** **Kindness**

Matthew 7:24 - "Therefore everyone who hears these words of mine and puts them into practice is like a wise man who built his house on the rock"

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Fiction - Style & Vocabulary

Creating plots is fundamental to story making but is often a challenge for young writers. Without a structure in mind to map a story out, the writing is likely to be directionless wandering from event to event with no way of drawing it to a conclusion. Stories, typically, have a four part structure: introduction® build-up® dilemma or crisis resolution and conclusion. Knowing about this structure from stories learned is a big help. Knowing about different generic story types and how they work helps even more e.g. cumulative stories, warning stories, losing and finding stories, journey and quest stories, defeating monsters and portal stories… Story mapping and boxing up are key strategies for children at every age to help them construct an overview of their story which gives them a helicopter view of where they are going, as they write. Plot-making should be linked to work on paragraph types below because paragraphing is the principle way in which the architecture of a plot is laid out.

Work on paragraph types links, of course, to the toolkit on creating plots above, since many of these paragraph types mark changes of scene as the story moves through the phases of the plot. Paragraphs are not used only to mark the big changes as a plot moves on and, as children grow in sophistication, we should expect them to write several paragraphs to narrate each phase of a plot, moving towards creating mini-chapters. Boxing-up is a fundamental strategy to structure work on paragraph writing and work arising from the Language Features Progression on sentence structure (e.g. sentence types, openings, voice, levels of formality etc.) is particularly relevant. Good paragraph writing is characterised by the range and variety of sentences used, and how they flow into one another. Equally important is knowing when to start a new paragraph and finding engaging connectives (words and phrases) which draw readers in and hook the paragraphs together with opening sentences that raise expectations, lay clues, put the reader in the right time and place etc., a following section on changing paragraphs draws attention to this.

Changing paragraphs: knowing when and why to change paragraphs should grow out of the work above and the final part of this section is a reminder for teachers, especially for more confident independent writers launching into their own inventions.

Building on Y3/4 work:

5. Equivalent Fractions, Decimals, and Percentages

- Recognise and generate equivalent fractions, decimals, and percentages.
- Use knowledge of equivalent values to simplify calculations.
- Compare and justify equivalence using bar models or number lines.

6. Order Fractions, Decimals, and Percentages

- Compare and order fractions, decimals, and percentages by converting them to a common value.
- Use inequality symbols (<, >) to show order and relationship between values.
- Solve reasoning problems that require comparing different representations of number.

7. Percentage of an Amount – One-Step

- Find simple percentages of an amount (e.g. 50%, 25%, 10%).
- Use mental strategies to find 10% and derive other percentage values.
- Solve one-step word problems involving percentage calculations.

8. Percentage of an Amount – Multi-Step

- Calculate more complex percentages (e.g. 35%) using decomposition strategies.
- Use multiplication and division to find percentages efficiently.
- Solve multi-step problems involving percentages in real-world scenarios.

9. Percentages – Missing Values

- Use inverse operations to find missing values in percentage problems.
- Solve equations where the percentage and total are known but the part is missing.
- Apply knowledge of percentages to real-life contexts, such as discounts and price increases.

Measurement: Area, Perimeter and Volume

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- Choose your plot: overcoming a problem; quest/journey; conquer the monster; character flaw; warning; lost and found; suspense; wishing; catastrophe; magical; story with a moral; changing (sad-happy, poor rich); traditional pattern
- Follow a plan: flowchart; timeline; storyboard; story map; story mountain
- Use controlled dialogue to move the story on
- Balance action, dialogue and description
- Create different atmospheres with different settings
- Show what the main character is like by what they say and what they do
- Write an ending that shows how the main character feels, or what has been learned - Use connectives to link ideas, sentences and paragraphs.

OPENING PARAGRAPHS A good opening will catch the reader's interest and make them want to read on.
Building on Y3/4 work, through writing:
- Weave in background information
- Introduce the main character and the problem.
- Intrigue and tease the reader
– raise questions in the reader's mind
- Hint that something is going to happen e.g. 'The dog barked only once and then it bit little Jazzy on the leg. She screamed but no-one came.'(PC)
- Create atmosphere – often a good way to open a story:
- portray a character e.g. Jim Jarvis. Want to know who that is? It's me! That's my name. Only thing I've got is my name..., (Street Child – Berlie Doherty)
- create a setting e.g. 'At the end of the lane stood an empty house.' (PC)
- describe an event or action e.g. The bomb exploded in the very place he had been standing moments earlier...,
- Use speech e.g. "I'm starving," groaned Tommy...,

BUILD-UP PARAGRAPHS Bridging paragraphs following the opening, leading up to the complication or problem in a narrative.
In writing: - Get your characters to do an ordinary/everyday activity, not knowing that things might go wrong. - Give further information about the characters to establish the types of people they are.

Shapes – Same Area (G1)

- Compare and reason about shapes with the same area but different perimeter.
- Understand that shapes can have the same area despite differences in their dimensions.
- Solve problems involving rectangles and other polygons with identical areas but varying perimeters.

Area and Perimeter (G1)

- Calculate the area and perimeter of rectangles, squares and compound shapes using formulae.
- Solve real-world problems involving area and perimeter, including word problems.
- Recognise the relationships between perimeter, area, and the dimensions of shapes.

Area of a Triangle – Counting Squares (G1)

- Estimate and determine the area of triangles by counting squares in grids.
- Understand that the area of a triangle takes up half the space of a related rectangle.

Area of a Right-Angle Triangle (G1)

- Apply the formula **Area = (base × height) ÷ 2** to calculate the area of a right-angled triangle.
- Solve contextual problems involving right-angled triangles, including word problems.

Area of Any Triangle (G1)

- Use the area formula **(base × height) ÷ 2** for any triangle.
- Identify and use the perpendicular height of a triangle when calculating its area.
- Solve multi-step problems involving the area of different types of triangles.

Courage **Resilience** **Honesty** **Kindness**

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PROBLEMS OR DILEMMAS Every story has a problem and sometimes more than one. The problem needs to be solved.
- Use a greater variety of methods to introduce the problem:
 - describe the mood or atmosphere first, e.g. As darkness fell mist poured over the edge of the crater, hiding the entrance to the Beast's lair.
- shock the reader with a sudden surprise
 - change the mood e.g. familiar – unfamiliar; calm – dangerous - use a question starter, e.g. Was she going the right way? She hoped so…, - use dialogue - Suggest the character's attitude towards the problem, e.g. Grasping his sword tightly, Theseus strode into the darkness of the labyrinth.
 - Hint at how the character might solve the problem, e.g. He would not be seeing his friends again, unless he could think of a way to escape.
 - Show what the character is feeling and thinking by using 'outside-inside' e.g. Gemma could hear the footsteps getting closer. She wondered how long she could stay hidden.
 - Use a variety of sentences to create effect - short to describe action or suspense then longer to add details
 - Use a more sophisticated range of adverbial openers which signal that there is a problem, e.g. In a flash…, Out of the blue…, With a scream…, Silently…, Nobody saw…

RESOLUTIONS The resolution is how the problem is solved by the main character.
In writing: - Use a greater variety of methods to resolve the problem:
- introduce a twist, e.g. The cave was empty – there was no dragon, no beast to fight.
- use –ed clauses as starters, e.g. Exhausted, the warrior fell to the ground.
- show character's reaction first, e.g. Clare sighed. She knew what she must do.
- Build up the resolution a 'frame' at a time – don't rush.
 - Move the story by adding description, e.g. In the distance, Kit could hear still hear the sound of battle, but his own was over.
 - Use a more sophisticated range of adverbial openers to signal that the problem is about to be resolved, e.g. Meanwhile…, Despite.., A few moments later…

Area of a Parallelogram (G1)

- Understand and apply the formula **Area = base × height** for parallelograms.
- Differentiate between the base and height in different orientations of parallelograms.
- Solve problems requiring the calculation of area for real-life contexts.

Volume – Counting Cubes

- Determine the volume of simple 3D shapes by counting unit cubes.
- Understand that volume measures the amount of space occupied within a shape.

Volume of a Cuboid

- Apply the formula **Volume = length × width × height** to calculate the volume of cuboids.
- Convert between different units of volume, such as cubic centimetres (cm^3) and cubic metres (m^3).
- Solve problems involving volume in real-world contexts, including capacity and storage problems.

Statistics

Line Graphs

- **Interpret line graphs** – Read and extract information from line graphs, including those with more than one dataset.
- **Draw line graphs** – Accurately plot points and construct line graphs to represent data.
- **Analyse trends** – Identify patterns, trends and relationships in data presented in line graphs.

Dual Bar Charts

- **Interpret dual bar charts** – Read and compare data from dual bar charts, including understanding categories and scales.
- **Construct dual bar charts** – Present comparative data using accurately drawn and labelled dual bar charts.

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ENDINGS The ending allows the writer to show what the main character has learned or how they have changed. It sometimes includes a moral and often refers back to the opening.
- Use a greater variety of methods to end the story:
- make your character comment on what has happened, e.g. I'm never doing that again, replied Sian.
- use And..., at the start of a sentence for effect, e.g. And this time she meant it.
- have an adult character make a comment, e.g. I think it might be best if I keep the key in future..., suggested the headmaster.
- mention an object or detail from the opening, e.g. The time machine was waiting. Until the next time...,
- introduce a twist, e.g. But there it was again – the knocking....
- use a question, e.g. But how long for? wondered Billy. - use a 'new beginning', e.g. It looks like we have another problem on our hands now.... said Sam.
- Show how your character has changed, e.g. ...stopped being a bully...,
- Use a more sophisticated range of adverbial openers which signal the ending, e.g. Nevertheless...., And so it was that..., After everything that had happened..., Even though

TIME-SLIPS Time-slips can be introduced at any stage of a story but often they are used at the start. They show how a character has changed or provide a greater understanding of why something has happened.
- Introduce a time-slip [forwards or backwards] to take the reader to another time in the story. Use adverbial openers such as: - It had only been a few hours ago that..., - Seb thought back to the moment when it all started to happen..., - Was it only a week ago? It felt like a lifetime to Pink..., - Imagine yourself in the future..., - The date is 20205 and...

Non-fiction – Instructions
Building on Y5/6 work
Instructional language is a familiar part of school and family life from an early age. 'Sit down', 'get your coat on', 'clean your teeth' etc., are common speech patterns, usually internalised before children begin school. The basic organisation of an instruction text is straightforward. The paradigm is a simple recipe with an introduction, some sequenced steps and a conclusion - mostly written with 'bossy' verbs. It is an important and

- **Compare datasets** – Draw conclusions based on comparisons between two data sets in a dual bar chart.

Read and Interpret Pie Charts
- **Extract information from pie charts** – Use knowledge of fractions, percentages and angles to interpret data represented in pie charts.
- **Compare different pie charts** – Identify relationships and differences between datasets shown in different pie charts.

Pie Charts with Percentages
- **Calculate values from pie charts** – Use percentages to determine actual values represented in a pie chart.
- **Convert between percentages, fractions and angles** – Apply proportional reasoning to interpret pie chart segments accurately.

Draw Pie Charts
- **Construct accurately proportioned pie charts** – Use a protractor to measure angles correctly and create a proportionally accurate pie chart.
- **Label pie charts clearly** – Ensure pie charts include correct labels, a title, and a key where necessary.

The Mean
- **Calculate the mean** – Find the mean (average) of a set of numbers by adding values and dividing by the number of data points.
- **Compare and analyse means** – Use the mean to compare different sets of data and draw conclusions.
- **Use the mean in context** – Apply understanding of the mean to real-life contexts, such as analysing test scores or sports statistics.

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challenging task to get this work effectively started with young children. However, a rather simplistic conception of instructional writing has led some believe that it has only limited potential for older children – what's the point of carrying on writing recipes? They are wrong. Instructional forms of learning and writing should play a vital part in developing logical understanding especially in maths, science and technology where processes and procedures are at the heart of understanding these subjects. Also, Instructional texts, more than most other text-types frequently depend on graphics: pictures, symbols, diagrams, flowcharts etc. to make processes clear, and this should be an additional challenge.

Building on Y3/4 work: Other subjects in the curriculum should provide rich content for instruction writing which can be taken to challenging levels with older children. This form of writing is common in e.g.
– Maths: e.g. directions for playing games, solving problems, doing calculations, constructing shapes and designs etc…
– Science: e.g. writing up processes and procedures: How to build an electrical circuit with a switch…, measuring time using the sun…, – Geography: calculating the height of trees..
– PHSE e.g. steps to take in dealing with hostile behaviour; Safety First instructions in case of emergencies…,
– Design and technology e.g. rules for safe handling of tools and materials; directions for constructing, assembling programming…
– Etc.
Increase the complexity of topics and steps to include to include:
– explanations e.g.: who the instructions are intended for; to introduce technical language; to guide readers on how to use the instructions; to describe/define outcomes e.g. what counts as winning, what a product should look or taste like, how it should behave; etc. – multiple prior or parallel steps e.g. Before this can be done, the ends should be tied off so that …While the glue is setting, cut the wires to fit round … – Options e.g. at this point you can either (a)…or (b)…; …any player may roll the dice but only the player with…etc.
– Advice e.g. Before you take the wrapping away…, You may need another pair of hands to help you do this…, although this could be done without drawing the lines,…

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Decide whether it will help to use symbols, diagrams, pictures, flow charts etc. to support the text. **Vary the tone and formality** e.g. to make instructions to sound: – authoritarian with uncompromising imperatives e.g. Leave the building quietly, Do not leave the area until…, – or more friendly and reasonable by using modal verbs may, might, should, could, would etc. and phrases like provided that…, so long as… etc. – speak to a general audience e.g. These regulations are intended for the use of…, – or to an individual e.g. To get the best results, take a few minutes to … When you have finished, check carefully to ensure your instructions are: – make sense and are free of ambiguity and contradiction, – effectively sequenced to achieve their objective, – can be understood by others.	
RE	**PSHE**
• **I can make connections** between Jewish practice, teachings from the Torah and their beliefs about God. • **I can give examples** of Jewish festivals and describe how they impact Jewish people today. • **I can explain** the meaning and significance of Jewish rituals and practices. • **I can comment thoughtfully** on how the role of women varies within Judaism. • **I can answer** the key question from different perspectives, including my own. **Knowledge building blocks:** **Pupils will know that:** • Jewish people believe in one God and that the Shema prayer gives details of the ways in which Jewish people should live, worship God and pray. • Jewish people follow the teachings of the Torah. It teaches them how to pray, worship and how to treat others. • Yom Kippur and Rosh Hashanah are the holiest days for Jewish people, where they ask for forgiveness at the start of their new year.	<u>Don't Hold On To What's Wrong</u> • **Be the best you can be**: Forgiveness keeps our hearts healthy • Work it Out Developing strategies to resolve conflict and disputes • Power of Forgiveness - Jimmy Mizen's parents: Discussing how we benefit when we choose to forgive others • Way to Say: Exploring how our tone and body language communicates more than our words • Bit by Bit: Discussing how to build trust between friends • Deep Impact Considering the impact of bullying (Reflection and self-evaluation)

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• Jewish people celebrate Pesach each year to remember God's rescue and faithfulness to the Israelites. • Tzedakah means 'healing the world' which is an important value in the Jewish faith as they are all challenged to care for the world that God gave them and the people who live upon it.	
Music	**PE**
Musicianship: -Tempo: 116 bpm (Moderato, a moderate pace) -Time Signature: 5/4 (5 crotchets in every bar) -Rhythmic patterns using minims, dotted crotchets, crotchets, quavers and their rests -Key Signature: G major (1 sharp) -Melodic patterns using the notes G A B C D E F# -Improvising – C D E F G A B **Listen and Respond:** Selection of songs (see overview) **Singing:** Selection of songs (see overview) **Playing:** Glockenspiel/ Recorder – G Bb B C D F (4 Parts)/ C E F G A Bb C (4 Parts)/ C# E F# G G# A B C (4 Parts) **Improvising and composition:** 1,2,3 or 5 notes – G A Bb C D/3 notes – F G A/ 3 notes - D E F# **Performing**: Perform and share what has taken place in the lesson	**Teacher Led PE: Hockey** -Work towards precision of movement, balance, and coordination with the stick and the ball. -Keep control of the ball whilst moving in different directions. -Understand how to tackle safely and avoid being tackled Send and receive a pass successfully and pass into a space or move into a space. -Mark a player and defend -Understand the rules, play multiple positions, and understand defence and attack. **Total Sports Coaching** **Outdoor Adventure** Finding Success Map Designing Leadership Problem Solving
French	**Computing**
Unit 12 - Dans la salle de classe classroom items	<u>Data and Information – Spreadsheets</u> Spring Term 2 ▪ To create a data set in a spreadsheet ▪ To build a data set in a spreadsheet ▪ To explain that formulae should be used to produce calculated data ▪ To apply formulae to data ▪ To create a spreadsheet to plan an event ▪ To choose suitable ways to present data

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Connected Curriculum	
Science	
Substantive Knowledge	Disciplinary Knowledge
Theme Park Materials **Roller Coaster** Visible Materials: Steel, plastic, rubber, wood Required Properties: Rigid: Maintains its shape under load. Strong: Can withstand the forces applied during operation. Smooth: Ensures a comfortable ride and reduces wear. **Log Flume** Visible Materials: Fibreglass, plastic, treated wood Required Properties: Buoyant: Must float on water and carry passengers. Waterproof: Must not allow water to seep through. Durable: Withstands exposure to water and weather elements. **Bumper Cars** Visible Materials: Steel, plastic, foam Required Properties: Flexible: Allows for impacts without breaking. Shock-absorbing: Reduces the force of collisions. Safe: Minimises injury risk to riders. **Endpoints** 1. Identify common materials used in theme park rides and their respective properties.	**Scientific Investigation Process** Identify the Question: What materials are suitable for building a theme park ride. Hypothesis Formation: Formulate an educated guess on which materials will float best. Experiment Design: Select a variety of materials (e.g., plastics, wood, metals) to test. Create a water tank (or use a large container) to perform the buoyancy tests. Data Collection: Record the outcomes for each material tested—whether they float or sink, and their stability while floating. Analysis: Compare results against the expected properties and decide which materials are best suited for a log flume vessel. Conclusion: Reflect on findings and make suggestions for the best material, explaining why it was chosen. **Skills Developed** Observation Skills: Noticing changes in water movement. Hypothesis Formation: Predicting outcomes based on speed changes in the swing. Measurement: Understanding and measuring force applications in real-life. **Scientific Method Steps** Ask a Question: What happens to the water when I change the speed of the swing? Conduct an Experiment: Fill the bucket with water and swing it. Analyze Results: Discuss observations about water and speed changes. Draw Conclusions: Relate the experiment to concepts of centripetal force. **Hypothesis Development**

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2. Understand the scientific method of investigation and apply it to material selection.

Centripetal Force

What is Centripetal Force?

Definition: Centripetal force is the force that acts on an object moving in a circular path, directed towards the centre of the circle.

Source of Centripetal Force: It can come from various sources, including tension (like in a swinging bucket), gravity, or friction.

Key Concepts

Radius of Circular Motion: The distance from the centre of the circle to the object moving in it.

Speed: The faster an object moves in a circular path, the greater the centripetal force required to keep it moving.

Gravity: This force acts downwards and affects the motion of objects completing vertical loops, such as roller coasters.

Endpoints

1. Understand how centripetal force works in conjunction with gravity and speed.
2. Explain the real-world applications of centripetal force, especially in roller coasters and theme park rides.
3. Engage in meaningful scientific dialogue about the importance of speed in creating centripetal force in vertical loops.

Loop the Loop

Why does the marble stay on the track?

Formulate a hypothesis about the height needed for the marble to complete the loop.

Variables

Independent Variables: Height of drop, size of loop.

Dependent Variable: Whether the marble completes the loop.

Controlled Variables: Type of marble, angle of the drop, materials of the track.

Data Collection

Create a table to record heights, loop sizes, and outcomes.

Data Collection

Trial 1: Record the number of swings with the initial weight.

Trial 2: Repeat the measurement to ensure accuracy and reliability.

Trial 3: Add additional weight and repeat the measurements.

Average Calculation: Add the three trials for each weight and divide by three to find the average number of swings.

Investigation Skills

Hypothesis: Students will hypothesize how many pulleys they think will be needed to lift a heavy object with less force.

Experimentation: Students will use broom handles and rope to create different pulley systems and test which one works best.

Observational Skills

Students will record observations regarding:

The amount of force used with varying numbers of pulleys.

The efficiency of each pulley system based on how easy it is to lift the load.

Hypothesis Formation

Predict outcomes based on scientific concepts.

Data Collection

Systematically record measurements and observations.

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The marble stays on the track due to centripetal force, which is generated by its velocity and the height from which it falls. The gravitational force pulls it down, while the speed keeps it moving in a curve.

What is the biggest diameter loop that the marble will travel around and still stay on?

This depends on the height from which the marble is released and its speed. Too large a loop may exceed the centripetal force needed, causing the marble to fall.

Endpoints

1. Explain how energy transfer and forces affect the marble's ability to complete the loop.
2. Predict the impact of changing variables on the marble's motion.
3. Work effectively in a team to conduct scientific experiments.
4. Present your findings clearly, with appropriate scientific language.

Investigating Pendulums

What is a Pendulum?

A pendulum consists of a weight (or bob) attached to a string or rod that swings back and forth under the influence of gravity. The swinging motion is known as oscillation.

Parts of a Pendulum

Bob: The weight at the end of the string.

String: The material connecting the bob to the pivot point (nail).

Pivot Point: The fixed point where the string is attached (e.g., the nail in the wall).

Key Concepts

Oscillation: The complete movement of the pendulum from its starting point to one extreme and back to the starting point.

Frequency: The number of oscillations made in one minute, measured in "swings per minute."

Use tables and graphs for clarity.

Analysis of Results

Compare results against hypotheses.

Discuss factors that may have impacted the outcome.

Evaluation

Reflect on the investigation process.

Identify potential improvements or further investigations.

- Royal Society of Chemistry - Materials Science
- Primary Resources for Science Experiments
- BBC Bitesize - Forces and Motion
- STEM Learning - Investigating Materials
- Science Buddies - Centripetal Force
- BBC Bitesize - Forces
- How Stuff Works - Centripetal Force
- BBC Bitesize - Pendulums
- The Royal Society - Why Pendulums Work
- Science Buddies - Pendulum Project Guide
- BBC Bitesize: Simple Machines
- Science for Kids: Pulleys
- NASA Climate Kids: Simple Machines
- Science Buddies - Air Resistance
- NASA - Understanding Forces
- National Curriculum Resources

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Weight: The mass added to the pendulum (e.g., slotted weights) that can affect the pendulum's motion.

Angle of Release: The initial angle at which the pendulum is pulled back to start swinging.

End Points

1. Demonstrate an understanding of how weight affects the motion of a pendulum.
2. Conduct a scientific experiment and understand the importance of fair testing.
3. Collect, record, and analyse data, drawing conclusions from their findings.
4. Communicate their results effectively, with clear reasoning for any patterns observed.

Investigating Pulleys

What is a Pulley?

A pulley is a simple machine that consists of a wheel on an axle or shaft.

A rope or cable runs along the groove on the wheel which helps lift loads.

Pulleys change the direction of force, enabling easier lifting.

Endpoints

1. Understand the purpose and function of pulleys.
2. Be able to explain the mechanical advantage when using one or more pulleys.
3. Conduct a simple experiment to show how pulleys can lift heavy loads with less force.
4. Engage in discussions about real-world applications of pulleys.

Resisting Motion

Forces

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Definition: A push or pull that can change the motion of an object.

Types: Contact forces (like friction) and non-contact forces (like gravity).

Air Resistance

Definition: A type of frictional force that acts against the motion of an object moving through air.

Factors Affecting Air Resistance:

Shape of the object

Surface area

Speed of the object

Water Resistance

Definition: A force that opposes the motion of an object through water.

Factors Affecting Water Resistance:

Shape and size of the object

Density of the water

Friction

Definition: A force that opposes the motion of an object in contact with a surface.

Types of Friction:

Static (not moving)

Kinetic (sliding/pulling motion)

Endpoints

1. Explain the concepts of air resistance, water resistance, and friction using appropriate vocabulary.
2. Conduct experiments using the scientific method to explore how these forces affect different objects.
3. Present findings clearly, using diagrams, tables, or graphs to exhibit results.
4. Suggest further investigations or modifications to existing experiments.

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Geography	
Substantive Knowledge	Disciplinary Knowledge
Plotting a Journey Theme and Adventure Parks in the UK: Alton Towers Resort: Located in Staffordshire, it offers a variety of exciting rides and attractions suitable for all ages. Thorpe Park: Situated in Surrey, it is famous for its thrilling roller coasters and water rides. Blackpool Pleasure Beach: Found in Blackpool, it offers a mix of traditional and modern rides, including the famous Big Dipper wooden roller coaster. Legoland Windsor Resort: Located in Windsor, it features various Lego-themed rides, attractions, and shows. Chessington World of Adventures: Situated in Chessington, it combines zoo animals with theme park rides and attractions. Urban and Rural Features: Urban Features: Busy roads, tall buildings, shopping centres, train stations, traffic congestion, etc. Rural Features: Open fields, farmland, country houses, winding roads, rivers, woodlands, etc. Modes of Transport: Car: Private vehicle used for individual or family trips. Bus: Public transport with fixed routes and schedules, suitable for larger groups. Train: Rail travel connecting various locations, offering speed and convenience. Transport Links: Motorways: Highways connecting major cities and towns. Train Lines: Rail network connecting different regions and cities. Bus Routes: Preset bus services covering specific areas and towns. **Endpoints** 1. Identify and locate popular theme and adventure parks in the UK on a map. 2. Understand the differences between urban and rural features. 3. Analyse transport links and plan a journey using different modes of transport. 4. Read and interpret bus and train timetables.	**Using Maps:** Identifying symbols on maps: Understand symbols used to represent theme parks, urban and rural features, and transport links. **Reading scale:** Understand the relationship between the distance on the map and the actual distance on the ground. Locating places: Use grid references or postcodes to pinpoint the location of theme parks, urban and rural features, and transport links. Students will learn about the similarities and differences between overseas and UK theme parks in terms of size, visitor capacity, cost, transport links, physical terrain, and location. They will develop their understanding of geographical concepts such as location, scale, and human-environment interaction. Students will use maps, atlases, and online resources to research and gather information about specific theme parks. They will compare and contrast the features of overseas and UK theme parks, considering the implications for visitors and the environment. • Official UK Theme Parks • Google Maps • Transport for London • National Rail • Official Disney World Website • Universal Studios Singapore Official Website • Europa-Park Official Website • Alton Towers Official Website • Thorpe Park Official Website • Legoland Windsor Official Website

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5. Calculate the duration of a journey by combining individual journey times.
6. Understand the importance of timetables and transport connections when planning a trip.

Worldwide Theme Parks

Size

Overseas Theme Park: Overseas theme parks can vary greatly in size. They may cover several hundred acres of land.

UK Theme Park: UK theme parks are generally smaller in size compared to overseas theme parks. They may cover tens to hundreds of acres of land.

Visitor Capacity

Overseas Theme Park: Overseas theme parks can accommodate a large number of visitors, ranging from tens of thousands to hundreds of thousands per day.

UK Theme Park: UK theme parks typically have a lower visitor capacity compared to overseas theme parks, ranging from thousands to tens of thousands per day.

Cost

Overseas Theme Park: The cost of visiting an overseas theme park can be higher due to travel expenses and currency conversion. Tickets, food, and accommodation costs vary widely.

UK Theme Park: The cost of visiting a UK theme park is generally lower compared to overseas theme parks. Tickets, food, and accommodation costs are generally more affordable.

Transport Links

Overseas Theme Park: Overseas theme parks often have well-developed transport links, including airports, train stations, and highways. Public transportation options may also be available for visitors.

UK Theme Park: UK theme parks are well-connected with transport links, such as main roads and motorways. Some may have train stations nearby, while others rely on bus or coach services.

Physical Terrain

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Overseas Theme Park: The physical terrain of overseas theme parks can vary considerably depending on the location. It could be coastal, mountainous, or flat landscapes. UK Theme Park: UK theme parks are typically located in relatively flat areas, although there may be some variations in the terrain. Location Overseas Theme Park: Overseas theme parks are located in different countries around the world. Examples include Disney World in Florida, Universal Studios in Singapore, and Europa-Park in Germany. UK Theme Park: UK theme parks are scattered across the country. Some popular ones include Alton Towers in Staffordshire, Thorpe Park in Surrey, and Legoland Windsor in Berkshire. **Endpoints** **1.** Compare the size, visitor capacity, cost, transport links, physical terrain, and location of an overseas theme park with a UK theme park. **2.** Analyse the advantages and disadvantages of visiting overseas and UK theme parks. **3.** Understand the significance of factors such as location and physical terrain on the layout and operations of theme parks. 4. Utilize geographical skills to collect, analyse, and present information effectively.	

Art	
Substantive Knowledge	Disciplinary Knowledge
Image Editing Understanding Facial Expressions Identify and interpret facial expressions of pleasure, fear, and surprise. Appreciate the use of a zoom lens to focus on facial expressions in photography. Define the emotions conveyed through facial expressions. Image Editing with Software Introduction to image editing software for adding details and effects.	**Photography Techniques** Using a zoom lens to focus on facial expressions. Capturing moments of pleasure, fear, and surprise. Understanding composition and perspective. **Image Editing** Uploading images to a computer. Adding details and effects using image editing software. Enhancing facial expressions through editing.

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Basic tools and techniques for enhancing photographs. Understanding the impact of adding details and effects on visual storytelling. Storytelling through Photography Explore how photographs can capture and convey emotions. Comprehend the storytelling aspect of a series of portrait photographs. Reflect on the emotions evoked by different facial expressions in images. **Endpoints** 1. Identify and interpret facial expressions of pleasure, fear, and surprise in photographs. 2. Demonstrate the use of a zoom lens to focus on facial expressions in portrait photography. 3. Apply basic image editing techniques to enhance photographs and add details and effects. 4. Create a series of portrait photographs capturing moments of pleasure, fear, and surprise on a moving roller coaster. 5. Reflect on the emotional impact of different facial expressions in images and the creative choices made during the project.	• National Geographic Kids - Photography Tips • Tate Kids - How to Take Great Photos • National Portrait Gallery: Understanding Facial Expressions • BBC Bitesize: Introduction to Photography • Tate Kids: Discover the World of Art • Adobe Photoshop Tutorials

Design and Technology

Substantive Knowledge	Disciplinary Knowledge
Cam Mechanisms Cam Mechanism: A cam mechanism is a simple machine that is used to transform circular motion into linear motion. Cams have specially shaped surfaces that push against other parts to make them move. Gears: Gears are toothed wheels that interlock to transfer motion and power. They can change the speed and direction of movement. Fairground Rides:	**Creating a Circular Cam Mechanism:** Use a technology kit to construct a simple circular cam mechanism following provided instructions. Describe the motion produced by the cam in detail. **Experimenting with Gear Combinations:** Explore different gear combinations to change speed and direction in a model system. Record observations on how different gears affect movement. **Designing a Fairground Ride:**

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Fairground rides are amusement rides commonly found in theme parks or funfairs. They often involve complex systems of cams and gears to create different types of movements and experiences.

Endpoints:

1. Be able to identify and explain the purpose of cam mechanisms and gears in various systems.
2. Construct a simple circular cam mechanism using a technology kit following instructions.
3. Experiment with different gear combinations to observe changes in speed and direction.
4. Design and create a fairground ride prototype incorporating cams or gears.

Carriage Design

Structural Design: Understanding the different elements that make up a roller coaster carriage, such as chassis, seats, restraints, and wheels.
Materials Used: Exploring the properties of materials suitable for construction, like steel, aluminium, and plastic.
Safety Features: Identifying crucial safety features in roller coaster designs, including restraints, emergency brakes, and impact-absorbing materials.

Endpoints

1. Explain the key components of a roller coaster carriage.
2. Identify the materials commonly used in roller coaster carriage construction.
3. Create detailed sketches and designs of roller coaster carriages, incorporating safety features.
4. Utilize CAD software to develop final designs with colour and decoration.
5. Present their final designs to peers, explaining their design choices and safety considerations.

Build a Ride

Cams:

Plan and sketch a fairground ride incorporating cams and gears to control movement.
Consider safety, aesthetics, and functionality in the design process.
Implementing Cam and Gears in the Fairground Ride:
Build the fairground ride prototype using cams and gears to achieve the desired motion.
Test the ride for smooth operation and adjust mechanisms if necessary

Engineering Principles: Learning about forces, motion, friction, and gravity and how they influence roller coaster design.
Design Thinking: Practising the design process, from ideation and sketching to prototyping and evaluation.
Aesthetics and Functionality: Balancing the visual appeal of the carriage with its structural integrity and safety requirements

Research and Investigation:
Research different types of cams and pulleys used in the industry.
Investigate how cams and pulleys are incorporated into theme park rides.
Designing and Planning:
Create detailed blueprints and sketches of the model ride.
Plan the construction process step by step.
Construction and Prototyping:
Build a prototype of the ride to test the functionality of cams and pulleys.
Use appropriate tools and techniques to construct the model ride.
Testing and Evaluation:
Test the model ride to ensure cams and pulleys function correctly.
Evaluate the design and make improvements based on feedback

- BBC Bitesize - Mechanical Systems
- STEM Learning - Cam Mechanisms
- Design and Technology Association
- Roller Coaster Physics - Exploratorium
- Design and Technology Association - Roller Coaster Designs

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A cam is a rotating or sliding piece in a mechanical linkage used to transform rotary motion into linear motion. Different types of cams include: egg-shaped cams, pear-shaped cams, and circular cams. Pulleys: A pulley is a simple machine that consists of a wheel on an axle or shaft used to lift heavy objects. Types of pulleys include fixed pulleys and movable pulleys. **Endpoints** 1. Design and create a model theme park ride incorporating cams and pulleys. 2. Present the model ride to the class, explaining the function of cams and pulleys. 3. Evaluate the design process and suggest improvements for future iterations.	