ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: For Narnia TERM: Autumn 2 YEAR GROUP: 5

THE BIG QUESTION	
What is gravity?	
END OF UNIT OUTCOME	Children plan their own investigation to explain what gravity is.
OBJECTIVES	• Identify the effects of air resistance, water resistance and friction that act between moving surfaces. • **Working scientifically** – Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas (non-statutory).
Working Scientifically	• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple comparative and fair tests. • Make careful observations and take accurate measurements. • Record findings using scientific diagrams, tables and graphs. • Use results to draw simple conclusions and make predictions for new values. • Report on findings, including oral and written explanations of results and conclusions.
Safety in Science	Follow CLEAPSS guidance when using ramps, scissors, water and other equipment. Ensure safe handling of materials and that children stand back when objects are dropped.
CONCEPT: Conflict	Exploring the conflict between forces acting in different directions (pushes vs pulls, friction vs motion, gravity vs air resistance).
LESSON 1 QUESTION	What is friction and how does it affect movement?
KEY KNOWLEDGE	Friction can stop or slow down a moving object. A stationary object will only move when the force applied is greater than the friction, which acts in the opposite direction to the movement. Friction produces heat, which we feel when we rub our hands together. Friction can cause some materials to wear away, such as pencils. Friction has many useful applications, such as in vehicle brakes, using sandpaper and walking on firm ground.
RICH TASK	Introduce The Big Question – what do they already know? Explore KO – copy in book after title page and paper copy home.

ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: For Narnia TERM: Autumn 2 YEAR GROUP: 5

<table>
<tr><td></td><td colspan="3">Work through slides to teach children required knowledge to answer the key questions. Children write Q in book and answer.
Key Q's:
What is meant by a force?
What is meant by a contact force?
What is friction?
How is friction caused?
What are some examples of where friction occurs?
How can friction help us?
What happens when two sticks are rubbed together?

Practical:
Does friction only occur between rough surfaces? Explain how you know.
Put a piece of ice and a piece of wood on a ramp. Tilt the ramp until the two objects move. Get the children to discuss why the ice moves first.

Children draw and label practical and write what they found out.</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">• Support: Provide word banks and labelled diagrams for reference. Model how to draw and label the practical.
• Challenge: Ask children to explain how friction can be useful and how it can be reduced in certain situations. Extend by linking to sports (e.g., skiing vs running).</td></tr>
<tr><td>KEY VOCABULARY</td><td>Force, contact force, friction, resistance, movement, surface, rough, smooth, heat</td><td>RESOURCES</td><td>Ice
Ramp
Piece of wood

Contact and Non-Contact Force - Definition, Difference, Example</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>LESSON 2 QUESTION</td><td colspan="3">What is air resistance and how does it affect moving objects?</td></tr>
<tr><td>KEY KNOWLEDGE</td><td colspan="3">Air resistance is a friction force between the air and a moving object.
Air resistance is greater when the surface area of the moving object is large.
Parachutes have a large surface area, so they have a greater air resistance and slow the skydiver down.
Air resistance increases with speed.</td></tr>
<tr><td>RICH TASK</td><td colspan="3">Retrieval practice activity - "Friction True or False" – Display 5 statements about friction (e.g., "Friction always slows things down," "Friction produces heat"). Pupils hold up True/False cards or move to corners of the room.
Revise KO</td></tr>
</table>

ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: For Narnia TERM: Autumn 2 YEAR GROUP: 5

<table>
<tr><td></td><td colspan="3">Work through slides to teach children required knowledge to answer the key questions. Children write Q in book and answer.
Key Q's:
What is air resistance?
What does air resistance do to moving objects?
Why is air resistance a friction force?
What happens when a skydiver opens their parachute?
How are aeroplanes and trains designed to reduce air resistance?
Why is it important for trains and aeroplanes to reduce air resistance when travelling at speed?
How does speed affect the amount of air resistance?

Practical:
Get two pieces of A4 paper. Scrunch one up into a ball and keep one flat. Ask the children what they think will happen when they are dropped. As a table - children explore dropping the paper and draw and write what they found out

In pairs: paper aeroplane competition – who can make theirs the most streamline and go the furthest. Children line up along one side of the classroom to test out their paper aeroplanes.</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">• Support: Scaffold practical write-up with sentence starters ("I noticed…", "The flat paper fell because…").
• Challenge: Encourage children to design a test to measure time taken to fall using a stopwatch.</td></tr>
<tr><td>KEY VOCABULARY</td><td>Air resistance, friction, force, speed, surface area, parachute, streamline</td><td>RESOURCES</td><td>A4 paper (flat and scrunched), paper for aeroplanes, stopwatch, tape measure</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>LESSON 3 QUESTION</td><td colspan="3">Does the surface area of a parachute affect how long it takes for it to fall to the ground?</td></tr>
<tr><td>KEY KNOWLEDGE</td><td colspan="3">• Parachutes slow falling objects by increasing air resistance.
• The larger the surface area, the greater the air resistance.
• Fair testing involves changing one variable and keeping the others the same.</td></tr>
<tr><td>RICH TASK</td><td colspan="3">Retrieval Activity:
"Forces Match-Up" – Provide cards showing different forces (friction, air resistance, gravity, water resistance) and examples of each. Pupils match the pairs.
Extension: Ask pupils to explain how two forces can act together (e.g., gravity pulling down, air resistance pushing up).</td></tr>
</table>

ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: For Narnia TERM: Autumn 2 YEAR GROUP: 5

<table>
<tr><td></td><td colspan="3">Work through slides to teach children required knowledge to answer the key questions. Children write Q in book and answer.
Key Q's:
How will the parachute be designed?
What materials and equipment are needed?
Which variable will you change (the independent variable)?
Which variable will you measure (the dependent variable)?
Which variables will you keep the same (the control variables)?
Make a prediction. What do you think will happen?

Enquiry question
Does the surface area of a parachute affect how long it takes for it to fall to the ground?

Practical:
Plan parachute investigate to find an answer to the enquiry question. Children draw their plan and answer the sentence stems
I predict that …
I think this will happen because …
The independent/dependent variable will be The controlled variables will be

Children also copy experiment instructions into books.</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">Support: Provide a labelled diagram of a parachute as a model. Help with recording results and forming predictions.
Challenge: Ask pupils to consider how parachute shape (not just size) could influence the results.</td></tr>
<tr><td>KEY VOCABULARY</td><td>Surface area, air resistance, gravity, variable, prediction, fair test, dependent, independent, control</td><td>RESOURCES</td><td>Plastic bags
Scissors
12 pieces of string 30 cm each
Ruler
12 paper clips
Stopwatch
Scales
Modelling clay to attach to the strings</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>LESSON 4 QUESTION</td><td colspan="3">What happens when we test our parachute designs?</td></tr>
<tr><td>KEY KNOWLEDGE</td><td colspan="3">Air resistance works against gravity, slowing falling objects.</td></tr>
</table>

ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: For Narnia TERM: Autumn 2 YEAR GROUP: 5

<table>
<tr><td></td><td colspan="3">

- Reliable results are gained by repeating tests and dropping objects from the same height.
- Recording and analysing results helps identify patterns and relationships.

</td></tr>
<tr><td>RICH TASK</td><td colspan="3">Retrieval practice activity - “Parachute Prediction Recap” – Ask children to recall their prediction from the previous lesson and justify it verbally to a partner using because.
Extension: Provide a mini data set and ask, “Which parachute would be most effective? How do you know?”

Revise KO

Key Q’s:
What is your prediction?
What do you think will happen in the investigation? Why?
Why is it important to drop the parachutes from the same height?
How will the results from the investigation be recorded?
How will the results from the investigation be reliable?

Enquiry question
Does the surface area of a parachute affect how long it takes for it to fall to the ground?

Children draw a table to record their results

Children carry out experiment and record results.

Evaluation
Children answer sentence stems:
I predicted that …
My prediction was correct/incorrect because …
From looking at our results, I can see that … This happened because …
For future investigation, I would like to find out …

Children then answer the enquiry question using knowledge from experiment.</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">

- Support: Sentence stems for results and conclusions (“I predicted…”, “I found out that…”).
- Challenge: Ask children to calculate average times for greater reliability.

</td></tr>
<tr><td>KEY VOCABULARY</td><td>Investigation, results, reliable, accurate, average, conclusion, air resistance, gravity</td><td>RESOURCES</td><td>Plastic bags
Scissors</td></tr>
</table>

ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: For Narnia TERM: Autumn 2 YEAR GROUP: 5

			12 pieces of string 30 cm each Ruler 12 paper clips Stopwatch Scales Modelling clay to attach to the strings
LESSON 5 QUESTION	Which shape is the most streamlined?		
KEY KNOWLEDGE	• Water resistance is a frictional force that slows movement through water. • Streamlined shapes reduce water resistance. • Objects with a larger surface area experience greater water resistance.		
RICH TASK	**Retrieval Activity:** *"Force Loop Cards"* – Pupils use a loop-card game where each card has a question on one side (e.g., "What force slows down objects in air?") and an answer to a different question on the other. **Extension:** Include challenge questions like "Why are dolphins and submarines similar in shape?" Work through slides to teach children required knowledge to answer the key questions. Children write Q in book and answer. **Key Q's:** What is water resistance? How can water resistance be reduced? What does "streamline" mean? Which shape is the most streamlined? Which shape do you predict will have the least/most water resistance? Why? Why is it important to keep the mass of the modelling clay the same? **Enquiry Question:** Which shape is the most streamline? **Practical:** Children to create 3 shapes out of playdough and drop into cylinder to see which shape is the most streamline. Children carry out experiment and then write down results in table. **Results:** Children use scientific knowledge to record and explain results by answering these questions I predicted that My prediction was correct/incorrect because From looking at our results, I can see that … This happened because …		

ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: For Narnia TERM: Autumn 2 YEAR GROUP: 5

<table>
<tr><td></td><td colspan="3">To make our investigation more accurate, we could …
For future investigation, I would like to find out …</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">• Support: Use pre-drawn shapes as templates. Provide sentence stems for predictions.
• Challenge: Ask children to explain why boats, fish, and submarines are streamlined.</td></tr>
<tr><td>KEY VOCABULARY</td><td>Water resistance, friction, streamline, shape, fair test, variable, force, prediction</td><td>RESOURCES</td><td>Tall measuring cylinder
Scales
Water
Modelling clay
stopwatch
Ruler</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>LESSON 6 QUESTION</td><td colspan="3">What is gravity and how can we investigate it?</td></tr>
<tr><td>KEY KNOWLEDGE</td><td colspan="3">• Gravity is a non-contact force that pulls objects towards the centre of the Earth.
• All objects fall at the same rate regardless of their mass, if air resistance is the same.
• Weight is the force of gravity acting on an object’s mass.</td></tr>
<tr><td>END OF UNIT OUTCOME</td><td colspan="3">Revision of key knowledge – ask children to write their own quiz style questions for their peers.

KO quiz
Outcome linked to The Big Question
What links to our concept have you found?

Children are to plan their own investigation. Children need to ensure it is a fair test and that they have a control and variables. Children need to draw and plan experiment, make a prediction and then write up what they found out.

Ideas could be….
Ask children to measure the mass of two pieces of modelling clay of different sizes. The greater the difference in the mass the better. Ask children to drop the objects from the same height at exactly the same time. Both objects should hit the floor at the same time.</td></tr>
<tr><td>SUPPORT AND CHALLENGE</td><td colspan="3">• Support: Provide sentence stems and structured planning template.
• Challenge: Encourage children to investigate how height affects speed or distance fallen, or to research Isaac Newton’s discoveries.</td></tr>
</table>

ST LAWRENCE C.E. PRIMARY SCHOOL LEARNING JOURNEY

SUBJECT: Science UNIT: For Narnia TERM: Autumn 2 YEAR GROUP: 5

KEY VOCABULARY	Gravity, non-contact force, weight, mass, pull, attraction, Earth, fair test, variable	**RESOURCES**	Modelling clay, ruler, stopwatch, scales, various objects to drop, planning and results template