

Lesson	2 of 6	National Curriculum links	Key lesson question	Why do things fall to Earth?
Learning objective		NC Y5: Children will: <ul style="list-style-type: none"> • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces Working scientifically: <ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • reporting and presenting findings from enquiries, including conclusions, causal relationships 	Resources	
I can investigate the effect of air resistance on falling objects using a fair test.			<ul style="list-style-type: none"> • lesson presentation (PPT) • science focus assessment sheet • investigation sheet/and scaffold Items you will need: cardboard tubes weights, coins or marbles stopwatch or tablet to record	

Teaching input

- **Scientific enquiry types and skills** – Review the ‘scientific enquiry types’ and ‘working scientifically skills’ the children will use in this lesson, highlighted on the slide.
- **Are there different types of forces?** – The slide shows the lesson questions the children will answer in this unit. The current lesson’s question is highlighted on the slide.
- **Key vocabulary for this lesson** – Go through the key vocabulary for this lesson and their definitions. Have any of the children heard these words before? Did they already know their meanings?
- **Testing** – Introduce Springer. Choose a child to read what Springer says about the scientific enquiry type, ‘Testing’. Springer introduces the lesson’s enquiry type. He links extra weight in a fall with the enquiry question.
- **Let’s recap** – The children are to discuss the questions on the slide with their learning partners, in groups or as a class. There are sentence starters on the slide to help them. Take feedback from the class before the answers are revealed on the following slide.
- **Let’s discuss** – Read through the information on the slide. The children are to look at the photo on the slide and explain what forces they can see with their learning partners, in groups or as a class. These slides introduce air resistance. There are sentence starters on the slide to help them. Take feedback from the class before the answers are revealed on the following slide. Force arrows show that air resistance is greater for the parachutist than for the skydiver.
- **Air resistance** – Read through the information on the slide. Go through the keyword and its definition in the ‘New word alert!’ box.
- **Word detective** – Read through the information on the slide.
- **Let’s discuss** – The children are to discuss the question on the slide with their learning partners, in groups or as a class. There is a sentence starter on the slide to help them. Take feedback from the class.
- **Let’s watch** – Introduce Freya. Read what Freya says about the lesson objective. The children are to watch the video about how quickly objects fall via the link on the slide. This demonstrates the forces the children will observe in the investigation.
- **Fair test** – Read through the information on the slide. The terminology of fair testing introduces and explains independent, dependent and control variables. Read through the slides and discuss how to carry out the test. Emphasise the importance of controlling variables, as this is the lesson’s enquiry focus. Go through the keyword and its definition in the ‘New word alert!’ box.
- **How to do a fair test** – Read through the information on the following two slides.
- **Investigation** – The children are to follow the instructions on the following two slides to conduct their investigations and complete their investigation worksheets. Once the children have prepared the skydiver tubes with different weights, they can test, measure and record their results. Using a tablet to record the drop will allow them to time accurately.
- **Results** – Read through the information on the slide. A set of results has been given. Look at this and model how to interpret the information.
- **Investigation** – The children are to complete the final section of their investigation worksheets.
- **What did we find out?** – Read through the information on the slide. The children are to discuss the question on the slide with their learning partners, in groups or as a class. The drop time SHOULD be fairly consistent across tubes regardless of weight, but as this is an investigation, their results may vary. Look for reasons and discuss if there are differences. There are sentence starters on the slide to help them. Take feedback from the class before the answers are revealed on the following slide.
- **Challenge** – The children are to discuss the question on the slide with their learning partners, in groups or as a class. There are sentence starters on the slide to help them. Take feedback from the class before the answers are revealed on the following slide.

Main activity	Challenge
The children conduct a fair test to determine whether weight affects the time it takes for an object to fall. They are guided through the control of variables (size, shape, drop height) and given a method to follow. They test and record results independently, then review the results. They can compare their results with some test data provided in the presentation. The best method for recording the drop time would be a tablet or other video recording device. Adapt this lesson by focusing on just two different weighted objects and comparing them to see which one drops first. A prerecording or digital simulation could be used.	Children are asked to imagine they drop a light ball and a heavy ball at the same time. They should use what they have learnt in the investigation to justify their answers.

Cumulative quiz questions	Self-assessment	Key vocabulary
4. What force slows a skydiver down? Air resistance 5. We drop a light ball and a heavy ball from shoulder height. They are the same size and shape. Which one will reach the ground first? They should reach the ground at the same time. 6. True or false: Air resistance is a type of friction. True	<ul style="list-style-type: none"> • I can describe the effect of air resistance on a falling object. • I can carry out a fair test by controlling variables. • I know that a heavier weight does not increase air resistance. 	prediction – a statement saying what we think will happen variable – something that can be changed balanced – the two parts or sides are equal force – something that makes an object move, stop, change shape, speed or direction gravity – a force that pulls objects towards each other