

Principles of Science:

- We ask questions
- We explore and investigate
- We use scientific vocabulary
- We make links with other subjects
- We have fun!

Focus scientists:

Isaac Newton, Galileo, Copernicus, Hawking

Writing opportunities:

Research and Biog on famous physicists
Podcast script

Key vocabulary: force

newtons gravity
friction air resistance
upthrust balanced
unbalanced gear lever
pulley planet contact
non-contact drag
thrust lift opposite
weight mass
acceleration
deceleration

Topic Overview: Forces

Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.

SCIENCE

Year 5



Autumn 2

Objectives:

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object ^[SEP]
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces ^[SEP]
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. ^[SEP]

Work scientifically by:

- Exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective.
- Exploring resistance in water by making and testing boats of different shapes.
- Designing and make products that use levers, pulleys, gears and/or springs and exploring their effects.

| Learning Outcomes/ Assessment | | |
|---|--|---|
| Emerging | Secure | Exceeding |
| <ul style="list-style-type: none"> • <i>Observe object/living things/event and comment on it</i> • <i>Notice similarities and differences in order to group and compare objects, living things and events</i> • <i>Link cause and effect; recognise patterns and relationships</i> | <ul style="list-style-type: none"> • <i>Show understanding of a concept by using scientific vocabulary correctly</i> • <i>Apply knowledge in familiar related contexts</i> | <ul style="list-style-type: none"> • <i>Create links to other curriculum areas</i> • <i>Apply knowledge in unfamiliar context</i> |
| | | |

**Write names of chn in appropriate column.*

| WALT | Key Vocabulary | Organisation | Notes for future planning |
|--|--|--|---------------------------|
| Knowledge: Initial assessment Working Scientifically area: | See all of above | Children completed the topic start page – giving knowledge plus initial questions | Chn not secure: |
| Success Criteria | | | |
| | | | |
| WALT | Key Vocabulary | Organisation | Notes for future planning |
| Knowledge: To understand what the main Forces terms mean, and give real-life examples of them Working Scientifically area: Research | gravity friction air resistance upthrust drag gravity friction | Science Homework – matching terms with their definitions and then giving examples for each. Review HW in class – check understanding of terms, and correct if necessary. Show BBC clips on examples of different Forces. Share children’s examples of different Forces. | Chn not secure: |
| Success Criteria | | | |
| I can understand what main Forces there are, and give examples of them | | | |
| WALT | Key Vocabulary | Organisation | Chn not secure: |
| Knowledge: To understand how forces effect an object Working Scientifically area: Exploration | gravity friction air resistance drag gravity friction balanced unbalanced | First of the 3 aerial sessions at Caxton House. Discussion and observation of Forces acting upon individuals. Link back to HW task, and follow-up lesson. | |
| Success Criteria | | | |
| I can observe and identify Forces, and attempt to explain what they do. | | | |
| WALT | Key Vocabulary | Organisation | |

| | | | |
|--|--|--|------------------------|
| Knowledge: To understand how air resistance effects an object Working Scientifically area: Exploration | air resistance acceleration aero-dynamic surface area | Paper 'leaf' experiment Involving making 'leaves', predicting time to fall to ground, observing and then concluding in relation to the surface area and how that effects air resistance. | |
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| | | | |
| LO | Key Vocabulary | Organisation | Chn not secure: |
| To test and understand the effect of water resistance | gravity friction water resistance upthrust balanced unbalanced | Discuss the terms water resistance and share examples and video. Chn to create a line of enquiry and investigate based around designing a boat to test its buoyancy. Review the steps of an investigation and discuss fair testing and the resources required. | |
| Knowledge: To understand how water resistance and upthrust work Working Scientifically area: Exploring, observing over time | | | |
| Success Criteria | | | |
| I can feel and describe the effects of Forces, | | | |
| WALT | Key Vocabulary | Organisation | Chn not secure: |
| Knowledge: To understand the effect of air resistance Working Scientifically area: Exploring, pattern-seeking | | 2 nd Caxton House session with Scarabeus Theatre Company. Through aerial theatre children experience of flying in harnesses, and then write up their feelings of gravity's pull and air resistance. | |
| Success Criteria | | | |

| | | | |
|---|-----------------------|---|----------------------------------|
| I can test and explain the effects of air resistance | | | |
| WALT | Key Vocabulary | Organisation | Notes for future planning |
| <p>I understand the forces behind how pulleys, levers operate</p> <p>Working Scientifically area: exploring,</p> | | <p>3rd Caxton House session – experimenting with a number of different pulley systems and a lever system.</p> <p>Children predict, participate/observe and complete sheet detailing what they observed when the different systems were used.</p> <p>Discussion and conclusion from findings.</p> | Chn not secure: |
| Success Criteria | | | |
| <p>I can test how levers and cogs work</p> <p>I can give a simple explanation of how pulleys and levers work</p> | | | |
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