Calday Grange Grammar School

Year 07 - Physics- Topic 01 - Forces

Understanding this is important because:

it provides a foundation for understanding the fundamental principles that govern the natural world and empowers students to comprehend the complexities of our universe, laying the groundwork for future scientific advancements and technological innovations.

Key Skills:

- Observational Skills.
- Experimental Design.
- Data Analysis.
- Mathematical Skills
- **HPL FRAMEWORK: Meta thinking, Linking, Realising, Creating, Analysing**

'The Big Picture':

- What is a force
- What is air resistance
- What are stretching and a compression
- Looking at what Hooke's Law is
- Understanding Pressure
- Looking at floating & Sinking
- Understanding what a moment is

Link to KS2- Forces

It is helpful if pupils:

Know that pushes and pulls change the speed, direction and shape of an object

Know how to measure distance and how to use a force meter to measure force in Newtons

Know that forces act in a particular direction and this can be indicated by arrows

Have experience of the effects of a variety of forces, *e.g. magnetic, gravity, friction air resistance*

NEXT LEARNING

-Link between mass and weight

-Representing forces with arrow diagrams and outcomes of forces with speed related diagrams

Relate speed changes to external forces

ASSESSMENT

- **FORMATIVE:** Peer assessment, Verbal assessment etc
- With in booklets
- **SUMMATIVE:**CCT/Exam/Q&A/ Quiz etc
- One CCT and two Home works per ½ term

Cross Curricular Links:

- English, Maths

Finding Connections With:

- Everyday interactions with objects and the understanding how forces can cause the outcomes observed

Curriculum Enhancement:

- (Reading around the topic, Documentaries, Visits to museums, galleries, theatres, online learning e.g. GCSE Bitesize, GCSE Pod, Youtube video links, careers links, enrichment activities etc)

Key Vocabulary / Terms:

Push, Pull, twist, stretch, extende, Hookes Law, Pascalls, Pressure, area, force, moments

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DEVELOPING TOMORROW'S LEADERS

Calday Grange Grammar School

Year 08 - Physics- Topic 01 - Forces

Understanding this is important because:

it provides a foundation for understanding the fundamental principles that govern the natural world and empowers students to comprehend the complexities of our universe, laying the groundwork for future scientific advancements and technological innovations.

Key Skills:(including practical skills)

Observational Skills.

Experimental Design.

Data Analysis.

Mathematical Skills

HPL FRAMEWORK: Meta thinking, Linking, Realising, Creating, Analysing

ASSESSMENT

- **FORMATIVE:** Peer assessment, Verbal assessment etc
- With in booklets
- **SUMMATIVE:**CCT/Exam/Q&A/ Quiz etc
- One CCT and two Home works per ½ term

'The Big Picture':

- Speed
- Distance Time graphs
- Links between Mass Weight and Gravity
- Understand where gravity comes from
- Understand how gravity acts on an object
- Under what the strength of gravity is on an object with mass

PRIOR LEARNING

Link to: KS2:Idea of contact and non contact forces. Students have looked at the idea of Gravity in KS2. Students have also covered the idea that a force can speed up and slow down and object and should have done some investigatory work on the areas covered in this topic

NEXT LEARNING

GCSE: Forces including equilibrium, resultant forces, moments. Pressure, upthrust and drag

Cross Curricular Links:

- English, Maths

Finding Connections With:

- Everyday interactions with objects and the understanding how forces can cause the outcomes observed

Curriculum Enhancement:

CURRICULUM ENHANCEMENT: (Reading around the topic, Documentaries, Visits to museums, galleries, theatres, online learning e.g. BBC Bitesize, Youtube video links, careers links, enrichment activities etc)

Key Vocabulary / Terms:

Weight, Gravity, Speed, Distance, relative motion

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DEVELOPING TOMORROW'S LEADERS

Calday Grange Grammar School

Year 09 - Physics- Topic 01 - Space

Understanding this is important because: it provides a foundation for understanding the fundamental principles that govern the natural world and empowers students to comprehend the complexities of our universe, laying the groundwork for future scientific advancements and technological innovations.

Key Skills:(including practical skills)

Observational Skills.

Experimental Design.

Data Analysis.

Mathematical Skills

HPL FRAMEWORK: Meta thinking, Linking, Realising, Creating, Analysing

ASSESSMENT:(Impact)

- **FORMATIVE:** Peer assessment, Verbal assessment etc
- With in booklets
- **SUMMATIVE:**CCT/Exam/Q&A/ Quiz etc
- One CCT and two Home works per ½ term

'The Big Picture':

- Identify their place in the Solar System and Universe
- learn how days, months, years and seasons happen
- use research tools
- in scientific enquiry pupils:
- use scientific knowledge and understanding to research answers for the project questions
- use investigative skills to research the project

PRIOR LEARNING

Link to: KS2: Describe the movement of the Earth, and other planets, relative to the Sun in the solar system Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

NEXT LEARNING

GCSE: Life and death of a star, circular motion ,universe

Cross Curricular Links:

- **Maths, Biology, Chemistry, English**

Finding Connections With:

- Understanding our place in the universe

Curriculum Enhancement:

CURRICULUM ENHANCEMENT: (Reading around the topic, Documentaries, Visits to museums, galleries, theatres, online learning e.g. GCSE Bitesize, GCSE Pod, Youtube video links, careers links, enrichment activities etc)

Key Vocabulary / Terms:

Solar System Universe Copernicus, Galileo, Asteroid, Planet, elliptical, eclipse, heliocentric, geocentric

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DEVELOPING TOMORROW'S LEADERS

Calday Grange Grammar School

Year 10 - Physics- Topic 01 - Atomic Structure

Understanding this is important because: it provides a foundation for understanding the fundamental principles that govern the natural world and empowers students to comprehend the complexities of our universe, laying the groundwork for future scientific advancements and technological innovations.

Key Skills: (including practical skills)

Observational Skills.

Experimental Design.

Data Analysis.

Mathematical Skills

HPL FRAMEWORK: Meta thinking, Linking, Realising, Creating, Analysing

ASSESSMENT:(Impact)

- **FORMATIVE:** Peer assessment, Verbal assessment etc With in booklets
- **SUMMATIVE:**CCT/Exam/Q&A/ Quiz etc
- One CCT and two Home works per ½ term

'The Big Picture':

- Structure of the Atom
- Rutherford experiment to disprove the Plum Pudding Model
- Alpha Beta Gamma Properties Ionisation and penetration depth
- Half Life
- Decay mechanism

Link to: Some learning about atomic energy from energy sources

From KS3 National curriculum: Understand that all matter is composed of atoms, Identify and describe the basic structure of an atom, including protons, neutrons, and electrons

NEXT LEARNING

GCSE Content links: Isotopes are variants of an element with the same number of protons but different numbers of neutrons, resulting in varied atomic masses Radioactive decay involves the spontaneous emission of particles.

Cross Curricular Links:

- **Maths, Biology, Chemistry, English**

Finding Connections With:

- Separate/Combined Paper 1

Curriculum Enhancement:

CURRICULUM ENHANCEMENT: (Reading around the topic, Documentaries, Visits to museums, galleries, theatres, online learning e.g. GCSE Bitesize, GCSE Pod, Youtube video links, careers links, enrichment activities etc)

Key Vocabulary / Terms:

Alpha Beta Gamma ionisation, Penetration, Rutherford

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DEVELOPING TOMORROW'S LEADERS

Calday Grange Grammar School

Year 11 - Physics- Topic 02 - Fluid Pressure

Understanding this is important because: : it provides a foundation for understanding the fundamental principles that govern the natural world and empowers students to comprehend the complexities of our universe, laying the groundwork for future scientific advancements and technological innovations.

Key Skills: (including practical skills)

Observational Skills.

Experimental Design.

Data Analysis.

Mathematical Skills

HPL FRAMEWORK: Meta thinking, Linking, Realising, Creating, Analysing

ASSESSMENT:(Impact)

FORMATIVE: Peer assessment, Verbal assessment etc

With in booklets

SUMMATIVE:CCT/Exam/Q&A/ Quiz etc

One CCT and two Home works per ½ term

'The Big Picture':

- Pupils learn the uses and dangers of nuclear sources.
- How alpha particles are the most dangerous inside the body and beta outside.
- That all sources kill living tissue.
- Uses for medical cleaning and treatment of cancer
- Background radiation
- Fusion and Fission

Curriculum Enhancement:

- **CURRICULUM ENHANCEMENT:** (Reading around the topic, Documentaries, Visits to museums, galleries, online learning e.g. GCSE Bitesize, GCSE Pod, Youtube video links, careers links, enrichment activities etc)

Key Vocabulary / Terms:

Ionisation, penetration, background, plutonium, Fusion and fission

Link to

KS2 Curriculum

Understand that atoms are the basic building blocks of matter. Learn that the number of protons in the nucleus determines the type of element.

NEXT LEARNING

A Level Physics

Learn to write and interpret nuclear decay equations for alpha and beta decay. Explore the use of nuclear energy, including power generation through nuclear reactors.

Cross Curricular Links:

- **Maths, Biology, Chemistry, English**

Finding Connections With:

- Paper 1

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DEVELOPING TOMORROW'S LEADERS

Calday Grange Grammar School

Year 12 - Physics- Topic 01 - Statics

Understanding this is important because:it provides a foundation for understanding the fundamental principles that governs a multitude of questions throughout the A Level course. It empowers students to comprehend the complexities of our universe, laying the groundwork for future scientific advancements and technological innovations.

- **KEY SKILLS**:(including practical skills)
- Observational Skills.
- Experimental Design and Facilitation.
- Data Analysis.
- Mathematical Skills
- **HPL FRAMEWORK: Meta thinking, Linking, Realising, Creating, Analysing**

- **ASSESSMENT**: Students ability to complete question tasks
- **FORMATIVE:** Peer assessment, Verbal assessment, 3 minute-wonders **SUMMATIVE:**SFT/Exams
- SFT on completion of a topic. A homework for every set of classwork questions complete. One writeup per experiment

'The Big Picture':

- Systems in Equilibrium and the conditions required
- SOHCAHTOA
- Pythagoras Theorem
- Moments
- Correct calculator use
- Triangle of forces
- Sin Rule
- Cosine Rule
- Resolving Forces

Prior Learning

Link to: GCSE maths – using SOCAHTOA and Trigonometry to process situations.

GCSE Physics – Calculating moments from both KS4

and KS3

Building towards a good foundation to be able to calculate a range of problems that come up at A Level. This also has foundations for subject related degrees.

NEXT LEARNING

Incorporating statics into everyday Physics problems across the curriculum

Cross Curricular Links:

- **Maths, English**

Finding Connections With:

- **AS PHYSICS**
- **Paper 1**

Curriculum Enhancement:

- Reading around the topic, Documentaries, Visits to museums, online learning e.g. Isaac Physics, YouTube video links, careers links, enrichment activities etc, 6th Form Library in W23, Google Classroom, Padlet

Key Vocabulary / Terms:

Moments, Resolving, Equilibrium, Pythagoras, SOHCAHTOA,

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DEVELOPING TOMORROW'S LEADERS

Calday Grange Grammar School

Year 13 - Physics- Topic 01 - Gravitational Fields

Understanding this is important because: it builds on previous knowledge and understanding the fundamental principles that governs a multitude of questions throughout the A Level course. It provides a grounding for the year 2 component and the overall A-Level. It empowers students to comprehend the complexities of our universe, laying the groundwork for future advancements and technological innovations.

Key Skills:

- Observational Skills.
- Experimental Design and Facilitation.
- Data Analysis.
- Mathematical Skills
- **HPL FRAMEWORK: Meta thinking, Linking, Realising, Creating, Analysing**
-

- **ASSESSMENT**: Students ability to complete question tasks
- **FORMATIVE:** Peer assessment, Verbal assessment, 3 minute-wonders With in booklets and personnel note paper
- **SUMMATIVE:**Homework**,** SFT

'The Big Picture':

- Newtons Law of Universal Gravitation
- Earths gravity and field lines
- Planets and satellite orbits
- Kepler's 3rd Law Derivation
- Gravitational Potential
- Escape Velocity
- Energy in orbit

Curriculum Enhancement:

- Reading around the topic, Documentaries,
- Visits to museums,
- online learning e.g. Isaac Physics, YouTube video links,
- careers links, enrichment activities etc, 6th Form Library in W23, Google Classroom, Padlet

Key Vocabulary / Terms:

- Universal Gravitation,
- Gravitational Potential,
- Unit mass,
- infinity,
- Kepler's,
- escape velocity,
- equipotential,
- field lines,
- estimating

Prior Learning

Link to: GCSE maths – calculations Trig & SOHCAHTOA

GCSE Physics – Gravity, Energy

A-Level –Motion, Circular Motion

Building towards a good foundation to be able to calculate a range of problems that come up at A Level. This also has foundations for subject related degrees.

NEXT LEARNING

Incorporating gravity into everyday Physics problems across the curriculum

Cross Curricular Links:

- Maths
- English

Finding Connections With:

- **A Level PHYSICS**
- **Paper 2**

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DEVELOPING TOMORROW'S LEADERS