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Year 9 Overview 2025-26 – *Physics*

Date	Wk	Week	Units Studied & Learning Outcomes	Key Concepts & Assessment
8 weeks (8 Lessons) (38Days)				
Tues 2-Sep Tues Y7 only Wednesday-whole school	A	1	• Overview of Unit/No. lessons Particles, radiation and density (8 lessons) **Lesson Sequence of Content**: 1 – Kinetic Theory (1 lesson) 2 – Conduction (1 lesson) 3 – Infrared (1 lesson) 4/5 – Infrared Required Practical (2 lesson) 6 – SI units and converting (1 lesson) 7/8 – Density + required prac (2 lessons) **Common misconceptions** Thinking cold can be transferred from one object to another; thinking objects that keep warm are sources of heat	**Foundational Concepts** Particles, Energy, Waves **Outcomes:** • To describe the states of matter in terms of the energy of their particles • Explain how heat is transferred by conduction using particles • Understand how the nature of the surface affects the absorption/emission of radiation • Know how to determine the density of a material **Tier 2/3 Vocabulary** **Key words:** Solid, liquid, gas, kinetic, conduction, vibration, emit, absorb, surroundings, mass, volume, thermal, fixed position, infrared, reflect, dissipate, density **Links to root words (etymology):** • Kinetic – from the word *kinein* – 'to move' • Thermal – from the word *thermē* 'heat' • Density – dense, closely compacted, thick • Dissipate – scatter **History & Culture:** • The particle theory of matter was not so much discovered as it was formulated, and that formulation began in ancient Greece. The person who is credited with having conceived of the idea that the world is composed of tiny, indivisible particles is the philosopher Democritus, who lived from 460 to 370 BCE. • This is a story about how the concept of density was first "discovered." around 250 B.C. The King of Syracuse, where Archimedes lived, thought that he was being cheated by the metal craftsman who made his golden crown **Careers:** Physics engineer, application developer, systems engineer ***Equality Diversity and Inclusion (EDI) links*** • Scientists from different backgrounds, nationalities • Chinese physician Yang Chen-Ning won the 1957 Nobel Prize for Physics, his book *Elementary Particles* was published in 1963 • French scientist Emilie du Châtelet first predicted the existence of IR in 1737 (slide in IR radiation Powerpoint) • Italian Leopoldo Nobili made the first thermopile IR detector in 1830 • German scientist Gustav Kirchoff formulated the blackbody theorem for IR in 1860 **Assessment** (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.) Week 3
8-Sep	B	2		
15-Sep (INSET Friday)	A	3		
22-Sep	B	4		
29-Sep	A	5		
6-Oct	B	6		
13-Oct	A	7		
20-Oct	B	8		

Prior (Y8)	Current (Y9)	Next (KS4)
Year 7 – Kinetic theory and energy	Understanding more detail on kinetic theory, thermal energy transfer and calculating density	Year 11+ Continual application of particle theory

				Misconceptions: Thinking cold can be transferred from one object to another; thinking objects that keep warm are sources of heat *Parent and Carers month/Black History month* *3/9 World afro day* *23/9 International day of sign languages* *10/10 world mental health day* *5/10 world teachers day* *6/10 World cerebal palsy day* •
Half-Term			**7** weeks (7 lessons) (35 Days)	
3-Nov	A	9	**Overview of Unit/No. lessons** Density, energy and efficiency (7 lessons) **Lesson Sequence of Content:** 1 – Factors affecting heat loss (1 lesson) 2 – House insulation (1 lesson) 3 – Energy stores (1 lesson) 4 – Efficiency (1 lesson) 5 – Increasing efficiency (1 lesson) 6 – Calculating Power (1 lesson) 7 – ST1 revision (1 lesson) **Foundational concepts:** Particles, Energy **Outcomes:** • Understand how we can prevent heat loss and factors affecting heat transfer • Understand how to insulate a house • Know the different types of energy store and that energy is conserved • Know how to calculate energy efficiency • Know how to calculate the power of electrical appliances **Key words:** Efficiency, specific heat, insulation, dissipated, energy store, transfer, pathway **Links to root words (etymology):** • Disipated – from the latin – *dissipat – 'scattered'* • Capacity – capac- that can contain **History & Culture:** • Development of increasingly efficient buildings- reducing heat loss, development of devices that reduces wasted energy stores • When researcher Dale Kleist attempted to create a vacuum seal between two glass blocks, an accidental stream of high-pressured air turned some of the glass into thin fibres. These fibres became the base of fiberglass insulation, which became popular in the 1940s • At some point in this period, double glazing was invented by the Scots and eagerly received. In the 1930s **Careers:** Construction, energy conservation officer, civil engineer, electrical engineer, electrician **EDI:** • Scientists from different backgrounds, nationalities • Scottish scientist William J.M. Rankine (1820-1872); French Nicolas L.S. Carnot (1796-1832) and German Rudolf Clausius (1822-1888), all founders of thermodynamics *Mens health awareness month/disability confident month*
10-Nov	B	10		
17-Nov	A	11		
24-Nov	B	12		
1-Dec	A	13		
8-Dec	B	14		
15-Dec	A	15		

Prior	Now	Next
Year 8 – Energy transfers	Applying thermal energy transfer Understanding specific heat Understanding and application of efficiency	Year 12/13 – Thermal physics Year 10 – Kinetic energy and work done

- GW: Recall examples of insulating materials, Know why the insulation is important, Know the different types of energy store
- BI: Plot an accurate graph of your results, Know different methods of insulating a house and calculate their payback time, Be able to give a simple energy transformation and identify pathways
- EW: Write a conclusion based on your evidence, Explain how different methods of insulation work and evaluate which should be installed first, Give a more complex energy transformation

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			Recall and apply knowledge, interpret data, calculate energy changes. **Misconceptions:** Believing energy can be created; thinking energy is only associated with movement; believing energy and force mean the same think	*1/11 Diwali* *12/11 Remembrance Sunday* *13/11-19/11 Transgender awareness week* *14/11 World Diabetes Day* *1/12 World AIDS day* *25/12 Christmas* **Assessment:** • Quick quiz • Exam style questions • Q&A • Interleaving • Week 15 (Efficiency)

Christmas Holiday		6 weeks (6 lessons) (30 Days)		
5-Jan	B	16	**Overview of Unit/No. lessons** ST1 Prep and feedback (4 lessons) Energy Resources (2 lessons) **Lesson Sequence of Content:** 1/2 – Revision for ST1 (2 lessons) 3 – Sit ST1 (1 lesson) 4 – ST1 Feedback (1 lesson) 5/6 – Energy Resources (2 lessons)	**Foundational concepts:** Particles, Energy **Outcomes:** • Know how to calculate the power of electrical appliances • Know the different types of energy resources • Know the advantages and disadvantages of renewable energy sources **Key words:** Efficiency, specific heat , dissipated, generate, renewable, greenhouse gases, reliability, wasted, surroundings **Links to root words (etymology):** • Dissipated – from the latin – *dissipat – 'scattered'* • Capacity – capac- that can contain • Renewable – to renew (resume, revice) **History & Culture:** • Development of increasingly efficient buildings- reducing heat loss, development of devices that reduces wasted energy stores • When researcher Dale Kleist attempted to create a vacuum seal between two glass blocks, an accidental stream of high-pressured air turned some of the glass into thin fibers. These fibers became the base of fiberglass insulation, which became popular in the 1940s • At some point in this period, double glazing was invented by the Scots and eagerly received. In the 1930s • In 1845 James Prescott Joule discovered the link between mechanical work and the generation of heat. These developments led to the theory of conservation of energy, formalized largely by William Thomson (Lord Kelvin) as the field of thermodynamics. **Careers:** Construction, energy conservation officer, civil engineer, electrical engineer, electrician, environmental studies, energy resources officer, energy engineer, civil engineer, meteorologist, electronic engineer **EDI:** • Scientists from different backgrounds, nationalities
12-Jan	A	ST1		
19-Jan	B	ST1		
26-Jan	A	19		
2-Feb	B	20		
9-Feb	A	21		

Prior	Now	Next
Year 8 – Energy transfers Year 8 – How power stations work	Understanding of *what* specific heat capacity is and *how* to calculate it Increasing the efficiency of an object Understanding the advantages and disadvantages of energy resources	Year 12/13 – Thermal physics

- GW: Calculate the specific heat capacity of a material, Know what is meant by efficiency, Know the equation for power, Know the different types of energy store, Know the 2 main types of energy resource
- BI: Know the definition of specific heat capacity, Calculate the efficiency of a device, Use the power equation to answer questions, Know some advantages of renewables sources

			• EW: Explain every day examples of specific heat capacity, Rearrange the efficiency equation, Explain how the efficiency of a device can be improved, Understand different devices transfer different amounts of energy in the same time, Explain the advantages and disadvantages of fossil fuels, Explain which type of energy source would be most suitable in a given area Recall and apply knowledge, interpret data, calculate energy changes, efficiency and specific heat capacity.	• EJ Zita, openly gay physicist researching renewable energy and sustainability, cofounded Lesbians in Science (1990) (slide in Energy resources lesson) • Dr Steven Chu, co-recipient of the Nobel Prize for Physics 1997 for solutions to climate change • Sri Lankan Hemamala Karunadasa dedicated research towards new materials for applications in clean energy, lead figure at the 2014 Global Climate and Energy Project • Hungarian-American Mária Telkes (1900-1995) one of the founders of solar energy technologies, nicknamed *The Sun Queen* • American Esther Takeuchi currently pioneering work in energy storage systems **Assessment:** • Quick quiz • Exam style questions • Q&A • Interleaving • Week 20 *LGBT+ History month* *27/1 Holocaust memorial day* *1/2 World Hijab Day* *6/2-12/2 Children's mental health week.* *7/2 Safer internet day* *10/2 Chinese New Year*
Half-Term			6 weeks (6 lessons) (28 Days)	
23-Feb	B	22	INSET 24th Feb **Lesson Sequence of Content:** 1/2 – Wave basics (2 lessons) 3/4 – Waves required practicals (2 lessons) 5 – EM spectrum (1 lesson) 6 - Uses of the EM spectrum (1 lesson)	**Foundational concepts:** Waves **Outcomes:** • Know the different types of energy resources • Know properties and uses of the EM spectrum • Know the advantages and disadvantages of renewable energy sources • Know the different types of waves • Be able to use the wave equation • Know how to measure the wavelength and frequency of a wave • Know how to measure the wavelength and frequency of a wave **Key words:** Energy, generate, renewable, greenhouse gases, reliability, wasted, surroundings, frequency, wavelength, hertz, transverse, longitudinal, amplitude **Links to root words (etymology):** • Renewable – to renew (resume, revice) • Frequency – from latin, *frequential,* crowded, frequent • Amplitude – from latin, *amplus* – large, abundant • Transverse – from latin, *transversus* – turned across (trans = across) • Longitudinal – from latin, *longitudal*, length of duration **History & Culture:** • In 1845 James Prescott Joule discovered the link between mechanical work and the generation of heat. These developments led to the theory of conservation
2-Mar	A	23		
9-Mar	B	24		
16-Mar	A	25		
23-Mar	B	26		
30-Mar (finish Wednesday 1st April)				
	A	27		

Prior	Now	Next
Year 8 – Energy transfers Y8 – sound as a longitudinal wave	Understanding the advantages and disadvantages of energy resources Knowing types of waves, mathematical calculations and applying it practically	Y12/13 Thermal physics

• GW: Know the 2 main types of energy resource, Be able to label wavelength and amplitude, Know the equipment needed for one of the waves practicals

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- BI: Give definitions for the two types of energy resource, Know some advantages of renewables sources, Know the different types of waves, Be able to correctly calculate the wavelength/frequency using the wave equation, Be able to describe how to measure the wavelength of a wave

- EW: Explain the advantages and disadvantages of fossil fuels, Explain which type of energy source would be most suitable in a given area, Be able to explain the difference between the different waves, Know when to substitute in prefixes in equations, Be able to describe how to measure the wavelength and frequency of a wave in both practicals

Recall and apply knowledge, evaluate information, compare and contrast, carry out practical, calculations using practical data, write methods

Assessment:

- Quick quiz
- Exam style questions
- Q&A

Interleaving
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of energy, formalized largely by William Thomson (Lord Kelvin) as the field of thermodynamics.

Careers:
Engineering, environmental studies, astronomy, energy resources officer, energy engineer, civil engineer, meteorologist, electronic engineer

EDI:

- Scientists from different backgrounds, nationalities
- Swedish scientist Hannes Alfvén won 1970 Nobel Prize in Physics for wave studies
- Pakistani-American astrophysicist first observed gravitational waves
- French scientist Jean-Baptiste le Rond d'Alembert devised a formula for obtaining solutions to the wave equation (slide in wave basics lesson)

Misconception: thinking waves carry matter from one place to another rather than energy
Women's history month
Ramadhan begins
World Down Syndrome day
Transgender day of visibility

Assessment (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.)
Week 26 (Waves)
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<tr>
<td colspan="2">Easter Holiday</td>
<td colspan="3">5 weeks (5 lessons) (24 Days)</td>
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<tr>
<td>20-Apr
27-Apr
4-May
(Bank holiday Mon)
11-May
18-May</td>
<td>B
A
B
A

B</td>
<td>28
29
30
31

32</td>
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Easter Monday 21st
Early May bank hol 6/5

Overview of Unit/No. lessons
EM spectrum and refraction (2 lessons)
Lesson Sequence of Content:
1 – Refraction (1 lesson)
2 – Mass and weight (1 lesson)
3 – Contact and non-contact forces (1 lesson)
4-/5 – ST2 revision

Prior	Now	Next
Y8 – Sound as a longitudinal wave Wave properties	Knowing types of waves, mathematical calculations and applying it practically Know the properties and uses of EM Waves	Year 12 – Photon model of electromagnetic radiation Gamma as part of the EM Spectrum

- GW: Know some parts of the EM spectrum and their uses
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Foundational concepts:
Waves

Outcomes:

- Know properties and uses of the EM spectrum

Key words:
Transverse, longitudinal, electromagnetic, wavelength, frequency, energy, refraction

Links to root words (etymology):

- Refract – broken up

History & Culture:

- Links to nuclear radiation and understanding of gamma radiation, real-world applications of refraction, space travel
- The first discovery of electromagnetic radiation other than visible light came in 1800, when William Herschel discovered infrared radiation. He was studying the temperature of different colors by moving a thermometer through light split by a prism. He noticed that the highest temperature was beyond red.

Careers:
Communications, nuclear physics, energy resources officer, energy engineer, civil engineer, meteorologist, electronic engineer
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			• BI: Know the correct order of the EM spectrum, describe the features of different types of wave • EW: Know which part of the EM spectrum has the longest wavelength, explain the different properties of EM waves. Recall and apply knowledge, use equations to calculate data, carry out practical, interpret and explain data.	**EDI:** • Scientists from different backgrounds, nationalities • J. Virginia Lincoln (1915-2003), ionospheric research and radio communications • Canadian Donna Strickland won 2018 Nobel Prize in Physics for groundbreaking inventions in the field of laser physics; only the fourth woman to win the prize • German scientists Wilhelm Röntgen discovered X-rays (1895) and Heinrich Hertz researched the production and reception of radio waves, unit of frequency named after him (slide in electromagnetic spectrum uses lesson) **Assessment:** • Quick quiz • Exam style questions • Q&A • Interleaving • Week 31 (Mass, Weight, Scalar & Vector)) *Good Friday 18/4* *Easter Sunday 20/4* *Autism and stress awareness month.* *25/4 World Malaria Day* *26/4 Lesbian visibility day* *UK national walking month.* *1/5-7/5 Deaf awareness week* *23/05 Vesak*
Half-Term			7 weeks (7 lessons) (35 Days)	
1-Jun	A	33	**Overview of Unit/No. lessons** **Lesson Sequence of Content:** 1 – ST2 revision (1 lesson) 2 – Sit ST2 (1 lesson) 3 – ST2 feedback (1 lesson) 4/5 – Hooke's Law and required practical (2 lessons) **Prior:** Y7 – Concepts of mass, weight and forces; Y8 – refraction (in *light* topic) **Now:** Further understanding of mass; Greater detail on what is happening in refraction **Next:** Year 10 – Calculating GPE; Applications of refraction • GW: Be able to draw a diagram showing refraction of light through a glass block, Know the difference between mass and weight, Know the type of energy stored in a spring • BI: Be able to explain why refraction occurs, Know the difference between	**Foundational concepts:** Waves, Force and Motion **Outcomes:** • Know what refraction is and how to draw a wave front diagram • Know the difference between mass and weight, and some contact and non-contact forces • Know how force and extension are linked in a spring **Key words:** Wavelength, frequency, application, mass, weight, gravity, the normal, direction, density, substance, spring constant, force, extension, directly proportional, elastic limit **Etymology –** • Refract – broken up • Extension; how much longer • Constant – standing firm **History & Culture:** • Robert Hooke's original experiment • Robert Hooke discovered Hooke's law while working in designs of a portable clock • Hooke's law is important because it helps us understand how a stretchy object will behave when it is stretched or compacted. **Careers:** Communications, engineering, applications engineer, design engineer, accelerator operator **EDI:** • Scientists from different backgrounds, nationalities
9-Jun	B	ST2		
16-Jun	A	ST2		
23-Jun	B	36		
30-Jun	A	37		
7-Jul	B	38		
14-Jul	A	39		

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			contact and non-contact forces and give examples, Know what the limit of proportionality is • EW: Be able to describe and explain an example of where we "meet" refraction, Understand the difference between a scalar and a vector quantity, Use the equation linking force, extension and spring constant Recall and apply knowledge, use equations to calculate data, carry out practical, interpret and explain data. Carry out practical, write method, identify variables, apply knowledge of equation, apply data to real-world context (springs).	• Christiane Bonnelle, French physicist and pioneering spectroscopist • Lucy Wilson (1880-1980), theories of vision, optics and spectroscopy • Huang Lu (1769-1829), Chinese optics inventor • French scientist Gaspard-Gustave de Coriolis, defined the Coriolis effect of forces • Swiss Leonhard Euler first developed ideas about Young's modulus in 1727 **Misconceptions:** Belief that mass and weight are the same thing *LGBTQ+ pride month.* *Gypsy, Roma and Traveller history month.* *12/6 world day against child labour* *18/6 autistic pride day* *20/6 World refugee day* **Assessment:** • Quick quiz • Exam style questions • Q&A • Interleaving • Week 37 •
(Total: 190 Days)				

Prompt Questions

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Please revisit the prompts from last year:

- What are the Key concepts for this unit?
- How will it link to wider disciplinary knowledge/cultural capital: history, culture, authentic artefacts, music, art, literature?
- How does it build on prior knowledge and link to other units, concepts, years, GCSE?
- What is it intended students will have learned?
  - For each Unit? By the end of the Year?
    - GW: ; BI: ; EW
- Is it worth summarising in a knowledge organiser?
- **Assessment: how do you know they have learned the foundational concepts, curriculum and wider disciplinary knowledge? Does assessment look like GCSE light? Should it?**
- Skills used/learned
- Tier 2/3 vocabulary ((Etymology e.g. of Greek/Latin)
- How will you assess students understanding?
- How will written feedback be given?
- How can lessons be adapted?