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| **Week 1 Lesson 1** | | | | | | |
| **Week 1 Lesson 2** | | | | | | |
| **Week 1 Lesson 3**<br>How do new drugs get onto the market? | clinical trial, toxicity, dosage, efficacy | Health, Disease and Body Systems | organ systems, animal cells | 1. Describe that the process of developing new medicines.<br>2. Discuss the ethics of the stages of drug trials (WS). | Which of the following correctly describes the process of developing a new medicine? A. Human trials → Animal testing → Laboratory research → Approval B. Laboratory research → Animal testing → Human trials → Approval C. Animal testing → Laboratory research → Human trials → Approval D. Laboratory research → Human trials → Animal testing → Approval<br>Correct answer: B<br>Why are new medicines tested on a small group of healthy volunteers before being given to larger groups of patients? A. To find out whether the drug tastes acceptable. B. To prove the medicine will definitely cure the disease. C. To ensure the medicine is cheap to produce. D. To find the safest dose and identify side effects.<br>Correct answer: D | A pharmaceutical company has developed a new drug to treat severe migraines. The drug has passed laboratory testing and animal trials. The company now wants to begin clinical trials quickly because the medicine could make a large profit.<br><br>**Task:** Explain the **stages involved in developing a new medicine** and evaluate the **ethical issues** that must be considered at each stage of clinical trials. Your answer should refer to **safety**, **informed consent**, **fair testing**, and **protection of vulnerable groups**. |

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| | | | | | Which statement best explains why drug trials can raise ethical concerns? A. Patients in trials may be exposed to unknown risks and side effects B. Scientists may waste time developing medicines that do not work. C. Medicines should only be tested after they are sold to the public. D. Animal testing is always illegal.<br>Correct answer: A | |
| **Week 1 Lesson 4**<br>How are sexually transmitted infections spread? | STI, sexual contact, barrier method, infection | Health, Disease and Body Systems | pathogens, bacteria, viruses, components of the blood | 1. Describe how STIs are spread. (including Chlamydia and HIV)<br>2. Describe how the spread of STIs can be reduced.<br>3. Describe the treatment of Chlamydia.<br>4. Explain why HIV cannot be treated. | Which reduces STI spread?<br>A. Sharing needles<br>B. Not washing hands<br>C. Using condoms<br>D. Touching doorknobs<br>Correct answer: C | |
| **Week 2 Lesson 1**<br>What are vectors and scalars?<br><br>L1 Vectors and Scalars.pptx | scalar, vector, magnitude, direction | Mechanics | KS2: speed, direction and distance | 1. Define scalar and vector.<br>2. Explain the difference between vector and scalar quantities.<br>3. Recall vector and scalar quantities. | Which row correctly matches a scalar and vector quantity?<br>A: speed (scalar), distance (vector)<br>B: velocity (scalar), force (vector)<br>C: speed (scalar), velocity (vector) | A student says: “Speed and velocity are the same thing because they both tell you how fast something is moving.”<br>Explain why this statement is incorrect.<br>Your answer should:<br><br>define scalar and vector quantities |

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| | | | | | D: mass (vector), weight (scalar) | refer to speed and velocity include an example. |
| **Week 2 Lesson 2**<br>What information can we get from a distance time graph?<br><br>0. Distance time graphs.pptx | gradient, speed, stationary, acceleration | Mechanics | P5 distance-time graphs | 1. Recall and use the equations:<br>a) (average) speed (metre per second, m/s) = distance (metre, m) ÷ time (s)<br>b) distance travelled (metre, m) = average speed (metre per second, m/s) × time (s)<br>2. Analyse distance/time graphs including determination of speed from the gradient.<br>3. Recall some typical speeds encountered in everyday<br>4. Describe a range of laboratory methods for determining the speeds of objects such as the use of light gates | What does a straight, horizontal line on a distance-time graph tell you?<br>A: stationary<br>B: constant speed<br>C: acceleration<br>D: deceleration | A cyclist travels along a straight road.<br>The distance–time graph shows:<br><br>0–20 s: a straight line<br>20–40 s: a horizontal line<br>40–60 s: a steeper straight line than before<br><br>Explain the cyclist's motion during each section of the journey.<br>Calculate the cyclist's speed during the fastest section if they travel 120 m in 20 s. |
| **Week 2 Lesson 3**<br>What is acceleration?<br>L3 Acceleration.pptx | acceleration, velocity, m/s2 | Mechanics | KS2: speed | 1. Recall and use the equation a = (v – u)/t<br>2. Use the equation v2 – u2 = 2 × a × x<br>3. Recall that the acceleration, g, in free fall is 10 m/s2 and be able to | An object speeds up from 2m/s to 10m/s in 4s. What is its acceleration?<br>A: 2m/s2<br>B: 3m/s2<br>C: 8m/s2<br>D: 12m/s2 | A car accelerates from rest to a velocity of 24 m/s in 6 s.<br>(a) Calculate the acceleration of the car.<br>(b) Explain what the value of acceleration tells you about the car's motion. |

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| | | | | estimate the magnitudes of everyday accelerations | | |
| **Week 2 Lesson 4**<br>How is acceleration affected by gravity?<br>L4 Acceleration due to gravity.pptx | gravity, gravitational field strength, mass | Mechanics | P5: weight, mass and gravity | 1. Recall and use the equation a = (v – u)/t<br>2. Use the equation v2 – u2 = 2 × a × x<br>3. Recall that the acceleration, g, in free fall is 10 m/s2 and be able to estimate the magnitudes of everyday accelerations | What is the acceleration of an object in free fall near the Earth's surface?<br>A: 1m/s2<br>B: 9.8m/s2<br>C: 10m/s2<br>D: depends on the mass | A feather and a stone are dropped in a vacuum chamber.<br>Explain why they hit the ground at the same time.<br>You should refer to:<br><br>gravity<br>acceleration<br>mass. |
| **Week 3 Lesson 1**<br>How do we represent velocity on graphs?<br>L5 Velocity- time graphs RPi.pptx | velocity, gradient, deceleration | Mechanics | P5 &P6 distance-time graphs | 1. Analyse velocity/time graphs to:<br>a) compare acceleration from gradients qualitatively<br>b) calculate the acceleration from the gradient<br>c) determine the distance travelled using the area between the graph line and the time axis | What does a straight, horizontal line on a velocity-time graph tell you?<br>A: stationary<br>B: constant speed<br>C: acceleration<br>D: deceleration | The velocity–time graph of an object shows:<br><br>a straight line sloping upwards followed by a horizontal line.<br><br>(a) Explain how you can tell the object is accelerating at first.<br>(b) Calculate the acceleration if velocity increases from 5 m/s to 25 m/s in 10 s.<br>(c) Explain how you would calculate the distance travelled during the motion. |
| **Week 3 Lesson 2**<br>Review and recall – revision techniques. | retrieval, space practice, flashcards | | P6 content | | | |

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| L6 Revision.pptx | | | | | | |
| **Week 3 Lesson 3**<br>What do forces do to an object?<br><br>L14 Acceleration of free fall.pptx | force, resultant, deform, accelerate | Mechanics | Y7 P2 and P5 | 1. Recall Newton's First Law and use it in the following situations:<br>a) where the resultant force on a body is zero, i.e. the body is moving at a constant velocity or is at rest<br>b) where the resultant force is not zero, i.e. the speed and/or direction of the body changes | A car moves at a constant velocity on a straight road. What can be said about the forces on it?<br>A: forces are increasing<br>B: forces are balanced<br>C: forces are equal to the mass<br>D: there are no forces acting | A hockey puck slides across ice at constant velocity.<br>Explain how Newton's First Law applies to the motion of the puck.<br>Include reference to:<br><br>forces<br>resultant force<br>velocity. |
| **Week 3 Lesson 4**<br>**How do forces act in circular motion (H)?**<br><br>**Terminal velocity.pptx** | **centripetal, velocity, radius** | **Mechanics** | **Forces Y7-9** | **1. Explain that an object moving in a circular orbit at constant speed has a changing velocity (HT)**<br>**2. Explain that for motion in a circle there must be a resultant force known as a centripetal force that acts towards the centre of the circle (HT)** | **A satellite moves in a circular orbit at a constant speed. Why is it accelerating?**<br>**A: its speed is increasing**<br>**B: its direction is changing**<br>**C: gravity is increasing**<br>**D: there is no acceleration** | **A ball on a string is swung in a horizontal circle at a constant speed.**<br>**Explain:**<br><br>**why the ball's velocity is changing**<br>**the direction of the force acting on the ball**<br>**the name given to this force.** |
| **Week 4 Lesson 1**<br>What is the relationship between mass and weight? | mass, weight, Newton, gravitational field strength | Mechanics | Y7 mass, weight and gravity | 1. Define weight, recall and use the equation: W = m × g<br>2. Describe how weight is measured<br>3. Describe the relationship between the weight of a | An astronaut has a mass of 80kg on Earth and the Moon. Why is their weight less on the Moon?<br>A: their mass is smaller<br>B: gravity is weaker | The weight of an astronaut changes when they move from Earth to the Moon, but their mass stays the same.<br>Explain why this happens.<br>Include the equation linking mass and weight in your answer. |

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| 0. Newtons First Law.pptm | | | | body and the gravitational field strength | C: they move slower<br>D: air resistance is lower | |
| **Week 4 Lesson 2**<br>What is Newton's second law?<br>F=ma.pptx | force, mass, acceleration, resultant | Mechanics | Forces Y7-9 | 1. Recall and use Newton's Second Law as F = m × a<br>**2. Explain that inertial mass is a measure of how difficult it is to change the velocity of an object (including from rest) and know that it is defined as the ratio of force over acceleration. (HT)** | What happens to acceleration is the force stays the same but mass increases?<br>A: it increases<br>B: it stays constant<br>C: it decreases<br>D: it becomes 0 | Two shopping trolleys are pushed with the same force.<br>Trolley A has a mass of 10 kg and trolley B has a mass of 20 kg.<br>Explain, using Newton's Second Law, why trolley A accelerates more than trolley B. |
| **Week 4 Lesson 3**<br>Core Practical: Investigate the relationship between force, mass, and acceleration by varying the masses added to trolleys (lesson 1 of 3)<br>Mass and weight.pptx | independent, dependent, control, repeat | Mechanics | Newton's 2nd law, forces KS3 | | | Practical Analysis |
| **Week 4 Lesson 4**<br>Core Practical: Investigate the | independent, dependent, control, repeat | Mechanics | Newton's 2nd law, forces KS3 | | | Practical Analysis |

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| relationship between force, mass, and acceleration by varying the masses added to trolleys (lesson 2 of 3)<br>Core Prac F=ma.pptx | | | | | | |
| **Week 5 Lesson 1**<br>Core Practical: Investigate the relationship between force, mass, and acceleration by varying the masses added to trolleys (lesson 3 of 3)<br>Core Prac F=ma.pptx | independent, dependent, control, repeat | Mechanics | Newton's 2nd law, forces KS3 | | | Practical Analysis |
| **Week 5 Lesson 2**<br>What is Newton's third law? | interaction pair, reaction, Newton, balanced | Mechanics | Newton's 2nd law, forces KS3 | 1. Recall and apply Newton's Third Law to equilibrium situations. | A book rests on a table. What is the correct Newton's Third Law pair?<br>A: weight and mass<br>B: weight and normal contact | A picture hangs at rest on a wall. Use Newton's Third Law to explain how the picture remains stationary.<br>Your answer should include a pair |

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| L23 Newton's third law.pptx | | | | | C: force of book on table and force of table on the book<br>D: force of Earth on the book and force of the book on the table | of forces acting on different objects. |
| **Week 5 Lesson 3**<br>**How do we apply Newtons 3d law to collisions (H)?**<br>Physics Forces L28 Momentum.pptx | **collision, momentum, impact** | **Mechanics** | **Newton's 2nd law, forces KS3** | **1. Recall and apply Newton's Third Law to collision interactions. (HT)** | **When a moving trolley hits a stationary trolley, which statement is correct?**<br>**A: the moving trolley exerts a bigger force**<br>**B: the stationary trolley exerts no force**<br>**C: both trolleys exert equal and opposite forces**<br>**D: only 1 force acts** | **A lorry collides with a small car. The driver says: "The lorry must exert a much bigger force because it is heavier."**<br>**Explain why this statement is incorrect, using Newton's Third Law.** |
| **Week 5 Lesson 4**<br>**What is momentum, how do we calculate it, and how do we apply Newton's second law to momentum in collisions (H)?**<br>**Physics Forces L29** | **momentum, conservation, impact** | **Mechanics** | **Newton's 2nd & 3rd law, forces KS3** | **1. Recall and apply Newton's Third Law to collision interactions and relate it to the conservation of momentum in collisions.**<br>**2. Define momentum, recall and use the equation: $p = m \times v$**<br>**3. Describe examples of momentum in collisions**<br>**4. Use Newton's Second** | **Which equation correctly defines momentum?**<br>**A: p=m+v**<br>**B: p = m/v**<br>**C: p = mxv**<br>**D: p = v/t** | **A trolley of mass 2 kg moves at 4 m/s and collides with a wall, coming to rest in 0.2 s.**<br>**(a) Calculate the change in momentum of the trolley.**<br>**(b) Calculate the force acting on the trolley during the collision.**<br>**(c) Explain why large forces can be dangerous in collisions.** |

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| Conservation of Momentum.pptm | | | | **Law as:**<br>**F = (mv – mu)/t** | | |
| **Week 6 Lesson 1**<br>Building Robotic Arms | pivot, force, lever | Mechanics | Newton's 2nd & 3rd law, forces KS3, pivots and levers KS3 | To construct a robot arm out of ice lolly sticks to pick up a ping-pong ball | Why are long arms useful in a robotic arm design?<br>A: they reduce mass<br>B: they increase friction<br>C: they reduce force needed<br>D: they reduce gravity | Practical Analysis |
| **Week 6 Lesson 2**<br>What are the factors which affect stopping distances? (lesson 1 of 2)<br>stopping distance new 2016 ks.pptx | thinking distance, braking distance, stopping distance, reaction time | Mechanics | B3 drugs and reaction time | 1. Explain methods of measuring human reaction times and recall typical results.<br>2. Recall that the stopping distance of a vehicle is made up of the sum of the thinking distance and the braking distance<br>3. Explain that the stopping distance of a vehicle is affected by a range of factors<br>4. Describe the factors affecting a driver's reaction time including drugs and distractions | What makes up the stopping distance of a car?<br>A; speed + braking time<br>B: thinking distance + braking distance<br>C: reaction time + speed<br>D: speed x time | A car is travelling at 15 m/s.<br>The driver sees a hazard and reacts in 0.8 s.<br>After braking, the car takes 25 m to stop.<br>(a) Calculate the thinking distance of the car. (2 marks)<br>(b) Calculate the stopping distance of the car. (1 mark)<br>(c) Explain two factors that could increase the stopping distance in real driving conditions. (3 marks) |
| **Week 6 Lesson 3** | thinking distance, | Mechanics | B3 drugs and reaction time | 1. Explain methods of measuring human reaction | Which factor will not increase the thinking | The stopping distance of a car is longer on a wet road than on a dry |

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| What are the factors which affect stopping distances? (lesson 2 of 2) Factors affecting braking distance 1 new 2016.pptx | braking distance, stopping distance, reaction time | | | times and recall typical results.<br>2. Recall that the stopping distance of a vehicle is made up of the sum of the thinking distance and the braking distance<br>3. Explain that the stopping distance of a vehicle is affected by a range of factors<br>4. Describe the factors affecting a driver's reaction time including drugs and distractions | distance?<br>A: drugs<br>B: speed<br>C: age<br>D: tyre conditions | road.<br>Explain why, referring to:<br><br>thinking distance<br>braking distance<br>factors affecting each one. |
| **Week 6 Lesson 4**<br>What are the dangers of crashes?<br><br>Factors affecting braking distance 2 new 2016.pptx | kinetic energy, impact force, deformation, crumple zone | Mechanics | KS3 forces | 1. Explain the dangers caused by large decelerations<br>**2. Estimate the forces involved in typical situations on a public road (HT)**<br>**3. Use Newton's Second Law as:**<br>**F = (mv – mu)/t (HT)** | Why do airbags reduce injury in crashes?<br>A: they reduce momentum<br>B: they reduce speed before impact<br>C: they increase collision time<br>D: they reduce mass | In a road collision, a car goes from 20 m/s to 0 m/s in a very short time.<br>Explain why this can cause serious injuries.<br>Use:<br><br>deceleration<br>change in momentum<br>Newton's Second Law. |
| Week 7 Lesson 1<br>PAZ 1 | | | | | | |
| Week 7 Lesson 2<br>PAZ1 | | | | | | |
| Week 7 Lesson 3 | | | | | | |

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| PAZ 1 Review | | | | | | |
| Week 7 Lesson 4<br>PAZ 1 Review | | | | | | |
| **Week 8 Lesson 1**<br>Review and practice of calculations (lesson 1 of 2)<br>reaction time new 2016.pptx | rearrange, substitute, units | Mechanics | P6 content | | | |
| **Week 8 Lesson 2**<br>Review and practice of calculations (lesson 2 of 2) | rearrange, substitute, units | Mechanics | P6 content | | | |
| **Week 8 Lesson 3**<br>What are ions?<br><br>Ions EMI.pptx | Ion<br>Electron<br>Positive ion (cation)<br>Negative ion (anion)<br>Charge<br>Atom | Bonding and properties | What is the difference between an atom and an ion? draw and label an atom | What happens when a chlorine atom becomes a chloride ion?<br>A. It loses one electron and becomes positive<br>B. It gains one electron and becomes negative<br>C. It gains one proton and becomes negative<br>D. It loses one neutron and becomes positive<br>**Misconception targeted:**<br>Students think gaining | 1. Explain how ionic bonds are formed by the transfer of electrons between atoms to produce cations and anions, including the use of dot and cross diagrams.<br>2. Recall that an ion is an atom or group of atoms with a positive or negative charge.<br>3. Calculate the numbers of protons, neutrons and electrons in simple ions | Draw a dot and cross diagram to show how sodium (Na) and chlorine (Cl) form an ionic bond.<br><br>Show the transfer of one electron from sodium to chlorine.<br>Label the resulting $Na^+$ and $Cl^-$ ions.<br>What is an Ion? (2 minutes)<br>In your own words, define what an ion is.<br>Explain the difference between a cation and an anion, and how they |

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| | | | | electrons makes ions positive. | given the atomic number and mass number<br>4. Explain the formation of ions in ionic compounds from their atoms, limited to compounds of elements in groups 1, 2, 6 and 7.<br>5. Recall the formulae of elements, simple compounds and ions | form.<br><br>Use the atomic number and mass number to calculate the number of protons, neutrons, and electrons in the following ions:<br>$Mg^{2+}$ (Magnesium ion)<br>$O^{2-}$ (Oxide ion)<br><br>Explain how elements in Groups 1, 2, 6, and 7 form ions.<br>Include examples like $Na^{+}$, $Ca^{2+}$, $O^{2-}$, and $Cl^{-}$.<br>Why do these elements gain or lose electrons? |
| **Week 8 Lesson 4**<br>How do ions join to make a new substance?<br><br>Ioning Bonding EMI 10ns3.pptx | Ionic bond<br>Electrostatic attraction<br>Metal<br>Non-metal<br>Compound<br>Formula<br>Giant ionic lattice | Bonding and properties | What type of elements usually form positive ions? and What type of elements usually form negative ions? | What holds sodium ions and chloride ions together in sodium chloride?<br>A. Shared pairs of electrons<br>B. Attraction between oppositely charged ions<br>C. Repulsion between electrons<br>D. Attraction between two negative ions<br>Misconception targeted: Students confuse ionic bonding with covalent sharing. | 1. Explain the use of the endings –ide and –ate in the names of compounds.<br>2. Recall the formulae of elements, simple compounds and ions.<br>3. Deduce the formulae of ionic compounds (including oxides, hydroxides, halides, nitrates, carbonates and sulfates) given the formulae of the constituent ions.<br>4. Explain the structure of an ionic compound as a lattice structure | Explain the difference between the endings –ide and –ate in ionic compound names.<br><br>What does –ide indicate?<br>What does –ate indicate?<br>Give one example of each (e.g., sodium chloride, sodium sulfate).<br><br>Write the correct chemical formulae for the following:<br>Sodium<br>Chloride ion<br>Nitrate ion<br>Calcium carbonate |

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| | | | | | a) consisting of a regular arrangement of ions<br>b) held together by strong electrostatic forces (ionic bonds) between oppositely-charged ions. | Magnesium hydroxide<br>(Hint: Use ion charges to balance the formulae)<br><br>Using the charges of the ions, deduce the formulae for:<br>Aluminium oxide<br>Potassium sulfate<br>Calcium nitrate<br>Iron(III) chloride<br>Show how the charges balance in each case. |