SP2 Motion and Forces

SP2a Resultant forces

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Explain the difference between scalar and vector quantities. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Use arrows to represent the direction and magnitude of forces. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Define a resultant force. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Calculate resultant forces. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Explain whether forces on an object are balanced or unbalanced. |  |  |  |

SP2b Newton’s First Law

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L5.jpg | Describe the effect of balanced forces on moving and stationary objects. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Describe the effect of a non-zero resultant force on moving and stationary objects. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | H Describe circular motion at constant speed as a changing velocity and hence as an acceleration. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | H Describe the force needed to keep an object moving in a circular path. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L8.jpg | H Give some examples of objects moving in circular paths and the type of centripetal force involved. |  |  |  |

SP2c Mass and weight

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L4.jpg | Describe the difference between mass and weight. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L4.jpg | List the factors that determine the weight of an object. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L4.jpg | Recall the equation for calculating weight. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Use the equation relating weight, mass and gravitational field strength. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L4.jpg | Describe how weight is measured. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L5.jpg | Describe how the weight of an object is affected by gravitational field strength. |  |  |  |

SP2d Newton’s Second Law

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Describe what an acceleration is. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | List the factors that affect the acceleration of an object. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Recall the equation that relates the factors affecting acceleration. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L8.jpg | Use the equation relating force, mass and acceleration. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L9.jpg | Change the subject of the equation relating force, mass and acceleration. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | **H** Explain what inertial mass means. |  |  |  |

SP2e Newton’s Third Law

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Describe what Newton's Third Law says. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Recall the meaning of ‘equilibrium situation’. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L8.jpg | Identify action–reaction pairs in familiar situations. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L8.jpg | Distinguish between action–reaction pairs and balanced forces. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L8.jpg | **H** Describe how objects affect each other when they collide. |  |  |  |

SP2f Momentum

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Describe the factors that affect the momentum of an object. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L9.jpg | Calculate the momentum of moving objects. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L8.jpg | Describe examples of momentum in collisions. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L9.jpg | Use the idea of conservation of momentum to calculate velocities of objects after collisions. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L10.jpg | Calculate the force needed to produce a change in momentum in a given time. |  |  |  |

SP2g Stopping distances

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L5.jpg | Describe how human reaction times are measured. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L5.jpg | Recall typical human reaction times. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L5.jpg | Describe the link between stopping distance, thinking distance and braking distance. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L5.jpg | Recall the factors that affect stopping distances. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Describe how different factors affect stopping distances. |  |  |  |

SP2h Braking distances and energy

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L9.jpg | Estimate the braking distance of a road vehicle given its mass, speed and braking force. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Explain what ‘work done’ means. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Calculate the work done when a force moves through a distance. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L5.jpg | Describe the factors that affect the kinetic energy of a moving object. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L9.jpg | Calculate the kinetic energy of a moving object. |  |  |  |

SP2i Crash hazards

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| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L10.jpg | Calculate the force needed to produce a change in momentum in a given time. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Explain the meaning of a ‘large deceleration’. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L6.jpg | Describe the dangers caused by large decelerations. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | Explain why large decelerations cause dangers. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L7.jpg | **H** Recall some typical forces involved in road collisions. |  |  |  |
| C:\Users\bhuiya_f\Downloads\Steps icons\Steps icons\Progression_icon_L9.jpg | **H** Use knowledge of changes in momentum to estimate the forces involved in road collisions. |  |  |  |