KS4 SEG Level 1 Award / Certificate / Diploma in Motor Vehicle Studies

|  | | **Unit 01** | **Unit 10** | **Unit 02** | **Unit 04** | **Unit 08** | **Unit 11** |
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| Learning outcomes/ composite knowledge:  Pupils will be able to… | | **Health and Safety for Motor Vehicle Studies** | **Unit 10 Introduction**  **to vehicle braking**  **systems** | **Engineering processes and materials** | **Introduction to SI power units** | **Introduction to Battery and lighting systems.** | **Introduction to vehicle inspection.** |
| Knowledge Components | Declarative knowledge  (know what) | The health and safety issues and procedures in the motor vehicle repair industry  The PPE that should be used for general work and PPE needed for specialist equipment.  Fire hazards, prevention measures and emergency fir procedures in the motor vehicle repair industry.  Types of fire and fire extinguishers.  Safe manual handling principles and lifting equipment used in the motor vehicle industry.  COSHH (control of substances hazardous to health) regulations.  A range of substances hazardous to health used in the motor vehicle repair industry.  The correct ways to dispose of waste products. | The hazards arising from working on vehicle braking systems and safe working practices that must be adopted.  Identify the equipment used to raise and support vehicles and remove road wheels.  Identify and interpret tyre size markings and the tools and equipment used to check tyres.  The function of micrometers, vernier gauges and dial test indicators and how to read them.  Identify disc brake components and describe the operating principles of a disc brake.  Identify drum brake components and describe the operating principles of a drum brake.  Identify the main system components and describe the operating principles of a hydraulic system. | The safety issues in a mechanical engineering workshop environment.  How to use basic engineering drawings.  The materials used in motor vehicle manufacture / engineering and components made from these materials.  The names of automotive and engineering hand and power tools and what they are used for.  The names of the equipment used to make internal and external screw threads  How to achieve a  polished finish on  metal. | Identify the hazards and safe working practices pertaining to working on vehicle engines.  Identify the major components of the spark ignition engine and describe their function.  Describe the induction, compression, power and exhaust strokes and the principles of operation of a four-stroke engine.  Identify the main components and layout of over-head cam and over- head valve engines and describe the operating principles.  How to use technical data sheets to find information about the engine.  Identify specialist  engine tools used when  working on spark ignition  engines.  Identify a range of sealing and locking devices used on spark ignition engines and give examples of where they are used. | The hazards and safe working practices pertaining to working on vehicle electrical systems.  Basic electrical principles --potential difference (voltage), current (amps), resistance (ohms) and power (watts).  Identify a multimeter and its functions.  Identify a range of electrical components used in circuits, - batteries, fuses, switches, bulbs, motors, buzzers, etc.  Basic electrical circuits (series and parallel) and circuit diagrams.  The equipment used for soldering electrical circuits.  Identify a range of electrical components used on vehicles.  Identify the main components of a vehicle interior and exterior lighting system.  Identify a range of instrument panel warning lights.  Vehicle fuses and fuse box layouts. | Vehicle protection measures that should be adopted to prevent damage to vehicles when working on them.  Identify key periodic inspections that should be performed on a vehicle and the main reasons for carrying them out.  What checks are included in pre-delivery inspections of new vehicles.  What checks are included in pre-delivery inspections of used vehicles.  What checks are included in pre-MOT inspections.  Industry standard  documentation used to  identify findings of  vehicle inspections and  how they should be used. |
| Procedural knowledge  (know how) | Select and use correct Personal Protective Equipment appropriate to the work being done.  Adopt safe working practices when lifting manually and with lifting equipment.  Manually lift a cylinder head.  Use trolley jack and axle stands to safely raise and support vehicles.  Use an engine crane to safely lift and move an engine.  Dispose of waste generated in the motor vehicle sessions appropriately.  Adopt safe working practices that minimise fire risks. | Remove and replace vehicle road wheels.  Use depth and pressure gauges to inspect and inflate tyres correctly.  Identify and locate the main components of a vehicle braking system.  Remove and replace disc brake components pads.  Identify and report on the condition of disc brake components.  Remove and replace brake drum and inspect drum brake components.  Check the condition of brake fluid and operation of brake warning lights. | Use an engineering  drawing and select  /use the appropriate  hand tools to mark out  materials for their  projects.  Use appropriate hand and power tools to cut and shape metal.  Use the pillar drill safely and correctly to drill holes in metal.  Use engineers taps and dies to form internal and external screw threads.  Finish the material to a polished standard using hand and power tools. | Select and use correct Personal Protective Equipment and adopt safe working practices during practical tasks.  Select and use appropriate hand tools to remove engine components from static engines.  Remove and refit rocker/ cam cover, inlet manifold,  exhaust manifold, alternator and drive belt, power steering pump, air conditioning compressor, rocker shaft, push rod, cylinder head and head gasket.  Remove and refit engine sump and pistons.  Use technical data sheets to find information relevant to the engine  Use specialist engine tools including Torque wrench, piston ring clamp and gasket scraper. | Identify the correct battery for a specified vehicle.  Remove and refit a vehicle battery.  Use a multimeter to carry out different battery tests.  Locate the components of a vehicle external lighting system and perform a vehicle external lighting check.  Replace a range of vehicle light bulbs**.**  Locate the components of a vehicle internal lighting system and check the operation of at least six driver information warning lights.  Locate, remove, test and  replace a lighting circuit  fuse. | Use safe working practices and take vehicle protection measures when undertaking routine vehicle inspection.  Carry out inspections that include:  • Engine oil level  • Coolant level  • External lights  • Screen washer fluid level  • Brake/clutch fluid level  • Condition of seatbelts  • Foot pedal and hand brake lever travel  • Driver warning lights  • body, paint, and trim  • Tyre condition  • Brake components  • Steering components  • Suspension components  • Wheel bearings  • Exhaust system  Complete Industry  Standard documentation  to identify findings of  vehicle inspections. |
| National Curriculum reference | | Health and safety for motor vehicle studies H/501/7005 | Introduction to vehicle braking systems Y/501/7017 | Introduction to engineering equipment and materials  A/501/7009 | Introduction to spark ignition power units T/501/7011 | Introduction to battery and lighting systems L/501/7015 | Introduction to vehicle inspection  D/501/7018 |
| Exemplar Composite Task(s) | | Draw a plan view of the motor vehicle workshop.  On the plan identify  Entrances and Exits  Emergency Exits  Vehicle lifting  equipment  The positions and types of Fire Extinguishers  Washing facilities  ABC motor vehicle studies unit 01 task 1.2 | Safely raise a vehicle using a trolley jack and axle stands.  Remove road wheels and inspect for rim damage, wheel buckle, stud hole wear.  Inspect tyre size, wear, tread depth and pressure  Refit road wheel and lower vehicle safely  Check Wheel nut torque  ABC motor vehicle studies unit 10 task 10.1. | Use an engineering drawing and a range of mechanical engineering hand and power tools to make a brass key ring and a pin hammer.  ABC motor vehicle studies unit 02 task 02.2. | Use a range of automotive hand tools, (including specialist tools and equipment for engine work), to dismantle, inspect and rebuild a basic overhead valve petrol engine.  ABC motor vehicle studies unit 04 task 4.1. | Inspect, remove and refit  vehicle batteries and carry  out battery maintenance  tasks.  Identify the battery  ratings, - nominal voltage  amp/hours and cold  cranking amps  Use a multi meter to  measure battery voltages  under different conditions  ABC motor vehicle studies unit 08 task 8.1. | Work in a safe and methodical way to carry out a pre-delivery inspection of a used vehicle.  Use industry standard documentation to record findings and advise on remedial work required to address defects found.  ABC motor vehicle studies unit 11 task 11.2. |