A woman with brown hair tied back, wearing a bright red jumpsuit, is working on the underside of a car. She is looking up at the car's chassis with a focused expression. The background shows a typical garage environment with various tools and equipment.

SKILLS-FOR-SCHOOLS TOOLKIT FOR THE TRADE OF AUTOMOTIVE TECHNOLOGY

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SKILLS-FOR-SCHOOLS TOOLKIT FOR THE TRADE OF AUTOMOTIVE TECHNOLOGY



Overview

This automobile toolkit is designed as a starter kit for teachers to introduce their learners to the automotive environment. The toolkit encourages students to develop an awareness and understanding of the automotive industry with a view to looking at it as a possible career option in the future.

There are six lessons for students aged 10–14 years with a variety of activities designed for classroom or ‘hands on’ practical assessment. This toolkit can undertaken as part of ‘enrichment activities’ or practical activities to supplement the corresponding curriculum content. The six lessons would require

12 timetable periods to complete all the skill based activities. Each lesson has learning objectives and additional resources to explore and discuss with learners. Activities also incorporate and explore the British Council’s six core skills for learning, life and work.

The toolkit can also be used in collaboration with partner school overseas.

We hope you enjoy exploring this toolkit with your learners.



Introduction

The automotive industry is a worldwide industry with a wide array of jobs available for enterprising and ambitious young men and women. The industry plays a huge role in our everyday lives in a variety of ways, helping us to get to work and school, delivering goods and providing emergency services.

In real terms the motor industry keeps the world moving. Many families in the industrialised world are car owners and the numbers are increasing yearly. This is evident from the table in Figure 1 showing new car production from the top ten producing countries in 2016.

Over 72 million new cars were produced in 2016 and this figure will continue to rise year on year as economies continue to grow. As all cars need servicing or repair throughout their lifetime there will be increased demand for qualified mechanics to keep vehicles roadworthy.

Careers in this industry include varied industry professionals such as ,mechanics, sales people, designers, finance experts and leasing agents.

There are many more careers associated with the industry and the production chain from parts to the finished product. With the finished product the automobile mechanic professional becomes the key person to ensure the vehicle is road safe at all times throughout its lifetime (modern cars could be on the road for 20 years or more).

Overdrive

Ask your students to look at the sheets on Figures 1 and 2 on the next page.

Discuss the numbers of cars being produced in different countries. What do they think accounts for the difference in figures? Why do they think China is such a successful automobile manufacturer?

What are your views on the recent move by the government to discourage use of petrol and diesel cars and encourage electric cars in India? How might this make a difference to these figures in the future?

What makes an effective company logo? Ask your students to devise a name and create a logo for a new automobile company of the future.

A career as an automobile professional means a guaranteed lifetime of work. Economic slumps can affect new car sales but vehicles will always require maintenance and repair. Automobile professionals will generally work independently and perform repairs or maintenance on their own. This independent work regime is an attraction for many industry professionals who can take up this field.

Detecting problems and doing repairs on your own vehicle gives you the self-reliance of not having to pay anyone else to get the job done! For motor enthusiasts putting their expertise to work makes this career rewarding.

This automobile toolkit is designed as a starter kit,

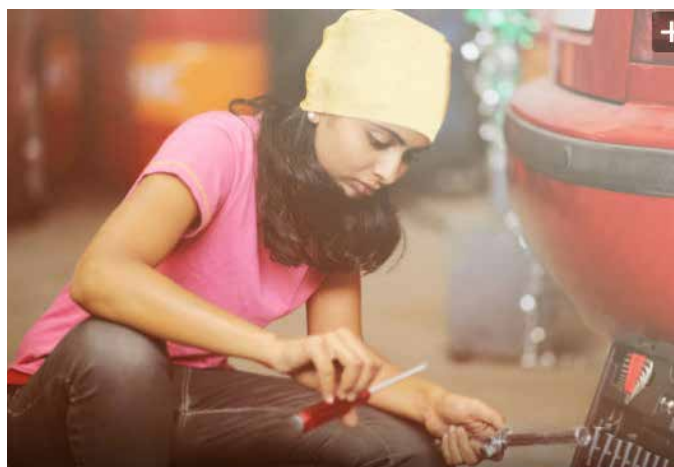


Figure 1: Number of Cars Produced in Different Countries 2016



Source: <http://www.oica.net/category/production-statistics/>

Figure 2: Automotive Companies in India

Automotive Companies in India

Major Indian Companies



Major Multi-national companies



Source: <https://image.slidesharecdn.com/autoindustryanalysis-090914160028-phpapp01/95/indian-auto-industry-analysis-4-728.jpg?cb=1272002140>

introducing learners to the automotive environment. The toolkit also explores career pathways for those, girls and boys, who are interested in a career in the automotive industry.

There are also a series of additional resources which include website links and videos which can be used for further research.

Lets Gear Up! (Information for teachers)

Learning is easy when it is fun! The numerous activities in this toolkit are aimed at middle school learners and allow for the differential learning needs of all types of students. The activities are intended to ensure engaging opportunities for enabling 'hands-on' skill based learning. These activities maybe adapted to the needs and interests of your students to add more value to your classroom learning experiences. The learning objectives are defined for all the activities.



'Classroom Activities' & 'Practical Activities' give you a kick-start to undertake various subject enrichment projects. They contain worksheets and activities that build on the syllabus content and engage the learners in acquiring an application based skill-set linked to Automobile Technology.

The 'Curriculum Links' show where the activities link to particular subjects such as Science, Social Sciences and Maths within the Middle School syllabus. The six lessons can also be broadened by teaching other topics or content, which you feel, would enhance the learning experience.

Preparation/Resources – refers to the pre-planning, setup and materials that are required to perform the 'Classroom Activities'.

Core Skills – refer to the critical skills that every learner will be able to acquire while undertaking the activities from this toolkit. These core skills orient learners towards 21st century skills, living and helping young people to become workplace ready. These include critical thinking and problem solving, creativity and imagination, digital literacy, student leadership and personal development, citizenship, communication and collaboration.

Pit-stop (Group Activity) refers to group activities designed to encourage the learners' ability to work in groups towards a common goal.

Mind Throttle (Individual Activity) refers to individual activities to assess the retention and application of the information.

Life Skills refers to information which encourages critical thinking in young learners and connects the concepts to real life.

Let's Surf refers to web-links to help your students explore more on the given topic.

Overdrive (Discussion) refers to discussion topics and brainstorming ideas designed to encourage an exchange of views and expression of thoughts.

Mind Rally (Research Activities) refers to research activities that can be undertaken to delve deeper into the topics and know more about the automotive technology.

Teacher Notes gives you more information about how to implement the toolkit effectively into your teaching-learning process.



Contents

Lesson 1	
HEALTH & SAFETY IN THE AUTOMOTIVE ENVIRONMENT	11
Lesson 2	
TOOLS AND EQUIPMENT IN THE AUTOMOTIVE INDUSTRY	25
Lesson 3	
TYPES OF CARS IN THE AUTOMOTIVE INDUSTRY	31
Lesson 4	
CAR PARTS IN THE AUTOMOTIVE INDUSTRY	37
Lesson 5	
SERVICING AND INSPECTIONS	45
Lesson 6	
CAREER PATHWAYS IN THE AUTOMOTIVE INDUSTRY	58
Additional Resources	71

Lesson 1: Overview

Learning Objectives

Understand the importance of Health & Safety in the workplace.

Understand the importance of Personal Protective Equipment (PPE)

Identify Personal Protective Equipment (PPE). Identify Safety/warning signs and their meaning.

Curriculum Links

All vocational areas, Science, Social science, Machines, Simple Machines, Transport, Urban Livelihood, Acid Bases and Salts, Coal and Petroleum, Health and Safety)

Core Skills

Critical thinking, problem solving, communication and teamwork.

Preparation and Resources

You will need scissors, pens and activity templates, Flash Card printouts.

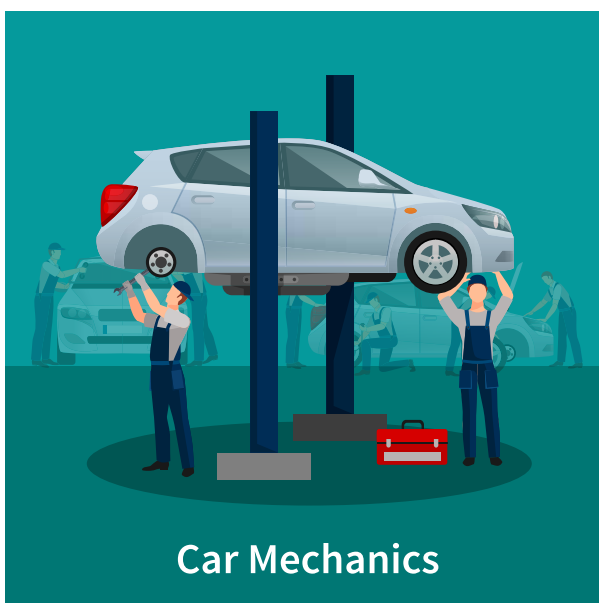
Health & Safety in the automotive environment

Let's talk about Health and Safety. As an introduction, ask your learners if they are aware of any examples of Health and Safety precautions in their classroom (e.g. Health & Safety poster, fire extinguisher, fire exit signs). Discuss the importance of Health and Safety awareness and how it impacts on our daily working life.

Laws such as The Health & Safety Act in 1974 in the UK and the Factories Act of 1948 in India were put in place to ensure that employers and employees must share responsibility for their own safety.

All automotive industries use several tools such as welding guns, grinding machines, cutting machines, drilling machines etc. Accidents may take place if the workers are not provided with proper training to use instruments/machines safely.

Wearing Personal Protective Equipment (PPE) may not be effective if the training is not given to the workforce. Using proper PPE and training can prevent ninety percent of injuries at the workplace.



Lesson 1: Classroom Activity 1

There are lots of potential hazards working in the automotive environment. Examples of potential hazards include acidic chemicals, fuels and gasses. These need to be handled carefully so that accidents are avoided.

One way of protecting yourself is to wear Personal Protective Equipment (PPE). It is a legal requirement that PPE must be worn to protect an employee from harm.

Pit-stop! (Group Activity) Make copies of Worksheet 1 and the information cards for each group. Give each member of the group an information card to share with the others.

Ask your learners to work in groups and identify the PPE in Health & Safety – Worksheet 1 and which parts of the body they protect. Then challenge them by asking them to give examples of what types of hazards they could prevent and at least 2 additional facts. (Answers – Health & Safety – Worksheet 1 Solutions).

Overdrive (Discussion topics)

Discuss types of PPE used in other industrial areas, for example in mining or construction. Use Health & Safety Flash cards as an aid.

Mind Rally (Research activity)

What are protective gloves made from?

What types of illnesses/injuries can arise from lack of protection?

For e.g. oil is carcinogenic and is linked to types of cancer, so it is important to wear protective equipment to keep safe.

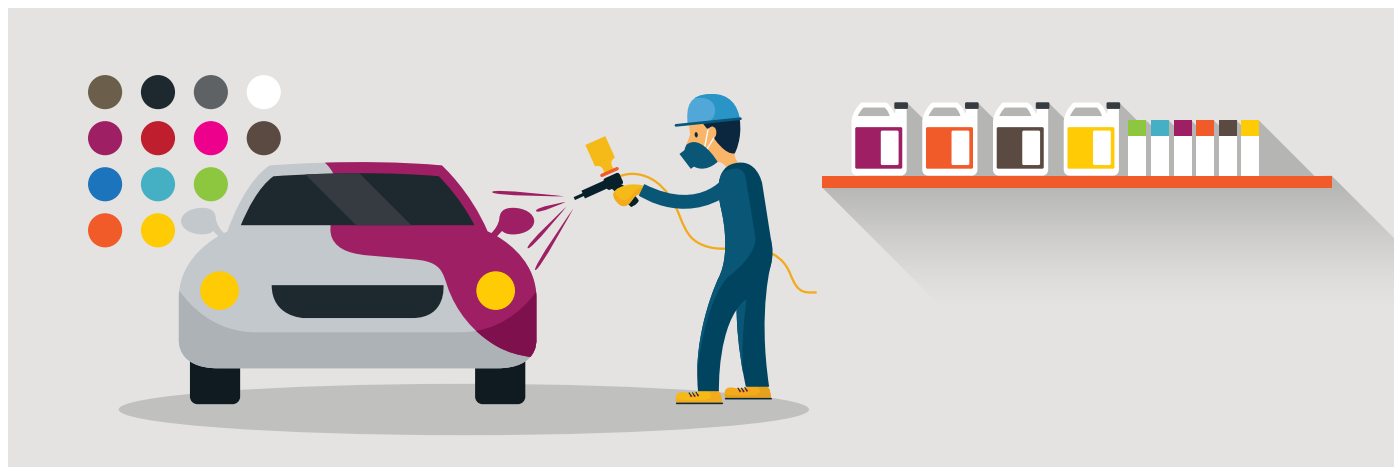


Life skill:


Why is it important to wear PPE in a garage? How is it different to PPE at a hospital?

Let's surf:


<http://www.bbc.co.uk/schools/gcsebitesize/design/textiles/consumersmaintenancehealthrev3.shtml>



Lesson 1: Pit-stop Activity 1 (Learner Worksheet)

	Name the PPE	What part of the body does it protect?	What type of hazard will it protect against?
			
			
			
			
			
			

Lesson 1: Pit-stop Activity 1 (Learner Worksheet solution)

	Name the PPE	What part of the body does it protect?	What type of hazard will it protect against?
	Safety Hat	Protects the head	Impact from falling or flying objects, risk of head bumping, hair entanglement.
	Industrial glove	Protects the hands	To protect the hands from abrasion, sharp edges, solvent and detergent solutions.
	Ear Muffs	Protects the ears	Protects from harmful noise, for example when using a drill or noisy piece of equipment.
	Overalls	To protect skin and clothing underneath	Overalls must be oil resistant. Oil is carcinogenic and can cause illness such as cancer.
	Safety Boots	To protect the feet	When working with heavy objects. Hard tip will prevent toe injury. Also protects against oil slippage and stepping on sharp objects.
	Goggles	Protects the eyes	Protects the eyes from flying particles, liquids splashes and dust. For example, when spray painting.

Lesson 1: Mind Throttle Activity 1 (Flash Cards)

Show these Flash Cards to the learners and ask them to speak about the PPE.

Teacher Resource



Lesson 1: Activity 2 (Fact Cards)

TEACHER NOTES

1. Now discuss the importance of health and safety in the automotive industry, referring to the pictures shown in the Flash Cards. Link it to the information provided on the fact cards below.
2. Document evidence of learning either by taking photographs of students and their work or by making short video stories (30 seconds to 3 minutes) on your smart phone and upload it on the social media (Integra, Twitter, YouTube, FB Page, V-logs, Blogs etc.). Documenting & sharing your good work help motivate not only your learners & you but also other educators.
3. A word of caution – before sharing any photograph/video of any learner, it is advised that a Media Consent Form is secured from their parents/guardians.

Ear Protection	Head Protection
Noise levels can be quite high in a garage. If for example, you are testing an engine, using an electronic drill or hammering an object, the noise level could affect your hearing. If your ears are not protected, then over time, exposure to loud noise can permanently damage hearing. Noise level is measured in Decibels (db). A whisper for example is 40db. Normal conversation is 60db. Listening to 85db over a period of 8 hours a day is considered to be safe for your ears. Louder noises such as drills or hammers would be above this level, so ears need to be protected.	When working as a motor mechanic it is important to wear a hard hat. If you remove it because you are too warm, or perhaps you think it's uncool to wear one – then think again. Hard hats are important as they protect your head from accidents such as; being hit by falling objects and bumping your head on hard objects. Head injuries can be very serious and can result in death. Employers must ensure their workers wear head protection when working with motor vehicles. It is also important that every mechanic takes responsibility for his or her own personal safety in the workplace.
FACT: An aeroplane taking off is 120db (dangerous/painful). Listening to an MP3 player on full volume is 100db (Very loud). Turn it down!!	TIP: Never be “too cool” to wear a safety hat, it can save your life
Eye Protection	Hand Protection
Most workplace eye injuries are caused by small particles or objects striking or scraping the eye. Examples include metal slivers, dust or sparks. Wear approved safety glasses or goggles, or a face shield (with safety glasses or goggles), or other safety headwear as necessary when doing work such as grinding, hammering, cutting, welding, and working with batteries.	The workplace can create many hazards for your hands, so it is important to protect them. Some hazards include working with chemicals that could burn your hands e.g. battery acid. You could also cut or hurt your hand when hammering or screwing at an object. It is therefore important to always wear protective gloves when working with vehicles.
FACT: Did you know that in 3 out of 5 eye injuries, workers use the wrong eye protection or no protection at all!	TIP: The UK & Indian governments provide guidelines of how to protect employees in the workplace by wearing Personal Protective Equipment. Employers must use these guidelines to train their workers to keep them safe.

Lesson 1: Activity 2 (Fact Cards)

Body Protection	Feet Protection
It is important to protect your whole body when working with vehicles. Every-day clothing must be covered while working in the workshop. Long hair can easily be caught in moving machinery, so it should be tied back away from the face. It is also important to remove jewellery such as rings, dangling earrings or necklaces. They could become entangled in a piece of machinery.	It is very important to protect your feet when working with vehicles. Footwear must have slip resistant soles, so if for example, there was an oil spill on the floor, you will not slip on it. Motor Vehicle safety footwear must always have steel toecaps, so that if a heavy object accidentally falls, your foot will be protected. Employers and workers must always ensure that they have the correct footwear to prevent injury.
TIP: Always keep your personal protective equipment clean and tidy. If they become damaged, they must be replaced. Always use equipment that has been approved by your employer.	FACT: Up to 20% of injuries in a garage are caused by slipping. Did you know that the best way to clean up an oil spill is to sprinkle sawdust on it!!



Lesson 1: Mind Throttle Activity 3 (Word search)

Instructions

Find the following personal protective equipment in the Word Search below.

SAFETY HAT

EAR MUFFS

OVERALLS

GOGGLES





BOOTS

GLOVES

O	X	Q	E	A	R	M	U	F	F	S	G	B	E	Q
Y	K	S	Y	Q	F	T	J	Y	T	H	O	A	E	D
I	Q	G	K	T	N	Y	A	M	H	S	X	Z	K	Q
H	Y	N	P	D	B	Z	G	M	Z	J	V	B	U	G
E	R	G	G	O	G	G	L	E	S	T	R	I	T	S
V	Y	L	A	A	O	V	X	I	Y	X	Z	H	V	K
X	T	O	J	F	V	S	T	F	D	S	Y	T	X	O
N	Z	V	Z	B	E	R	E	F	U	A	F	S	X	K
B	Q	E	H	B	R	Z	G	T	A	F	M	T	B	I
P	J	S	X	O	A	I	U	I	O	E	B	O	T	S
W	H	T	D	Z	L	F	F	H	X	T	Q	O	G	I
Z	N	E	G	B	L	F	W	M	O	Y	Z	B	K	W
D	D	N	Z	R	S	Y	L	X	T	H	T	K	F	L
Z	D	X	T	M	L	F	L	D	U	A	W	K	Q	J
C	U	O	D	U	H	W	P	A	O	T	I	V	K	R

Lesson 1: Pit-stop Activity 4 (Safety signs)

Know your colours

	<p>This is a type of mandatory sign, which means you “must do”. These signs have a blue background with either a white image or white text.</p>
	<p>This is an example of a warning sign, which means be careful, caution or be aware. Cautionary signs have a yellow background with either black image or black text.</p>
	<p>This is an example of a safe or advisory sign. It has a green background with either a white image or white text.</p>
	<p>This is a “do not” or prohibited sign. It generally has a red surround with black/white image or black/white text.</p>

Teacher Notes








It is important to recognise different safety/warning signs in the working environment and to wear the appropriate PPE to protect yourself.

Practical Activity

Practical – (onsite visit to a traffic training park for children) Ask students to draw and identify different types of signs and what they mean at the park, and any that they pass on the journey there.

Lesson 1: Pit-stop Activity 4 (Worksheet)

Look at the following signs and identify the type of sign and its meaning.

SIGN	WHAT TYPE OF SIGN IS IT? 1. Mandatory “must do” 2. Warning/caution sign 3. Safe/advisory sign 4. Prohibited “do not” sign	WHAT DOES THE SIGN MEAN?
		
		
		
		
		
		
		

Lesson 1: Pit-stop Activity 4 (Worksheet solution)

Below is the solution to the previous activity.

SIGN	WHAT TYPE OF SIGN IS IT? 1. Mandatory “must do” 2. Warning/caution sign 3. Safe/advisory sign 4. Prohibited “do not” sign	WHAT DOES THE SIGN MEAN?
	Mandatory	Eye Protection must be worn
	Safe/Advisory	Fire Exit
	Prohibited	No Smoking in this area
	Warning/Caution	Slippery Surface
	Mandatory	Head Protection must be worn
	Warning/Caution	Flammable Liquid
	Safe/Advisory	First Aid

Lesson 1: Activity 5

PRACTICAL ACTIVITY (OPTIONAL)

Onsite visit to a garage.

Create a map of the workshop and identify any hazards.

OR

Show learners a virtual garage or a short video of an automotive garage.

Ask them to identify any hazards (onsite or in the video).

What types of injuries could result from such hazards? How would you prevent accidents from happening?

Life skill:

Why is a clean working environment important in a workplace? What must be done in order to avoid accidents at the workplace?

Teacher Note

It is important to make the learners aware of the personal safety in the workplace so that accidents can be prevented.

Provide learners with Activity 5 Worksheet to examine the implications of an unsafe working environment and what can be done to prevent this.

Share the following information:

SAFE WORKING ENVIRONMENT

- Reduce spills by tidying up at all times.
- Dispose of waste in appropriate waste containers.
- Place oily rags in a covered metal container.
- Dispose of materials according to local environmental requirements.
- Keep your workplace clean and tidy.

1. Document evidence of /for learning either by taking photographs of students and their work or by making short video stories (30 seconds to 3 minutes) on your smart phone and upload it on the social media (Instagram, Twitter, YouTube, FB Page, V-logs, Blogs etc.). Documenting and sharing your good work help motivate not only your learners & you but also peer educators.
2. A word of caution – before sharing any photograph/video of any learner, it is advised that a Media Consent Form may be secured from their parents/guardians.

Lesson 1: Pit-stop Activity 5 (Worksheet)

Safe Working Environment

Look at this picture below of workshop hazards.



List five hazards from this picture	For each hazard, what would you do to prevent an accident happening?
1	
2	
3	
4	
5	

Lesson 1: Pit-stop Activity 5 (Worksheet solution)

Safe Working Environment

Look at this picture below of workshop hazards.



List five hazards from this picture	For each hazard, what would you do to prevent an accident happening?
1. Oil spillage on floor. Man could slip.	Clean up the spillage.
2. Man under the car does not have PPE on, could injure himself.	Put on the appropriate PPE. Hat, shoes, overalls, gloves and goggles.
3. Electric cable lying across floor. Man could trip.	Remove cabling and store in an appropriate place.
4. Petrol can on floor. Potential fire hazard.	Move the can and store in a safe place.
5. Spray bottle on the ground. Could contain flammable liquid or man could trip over it.	Remove spray bottle and store in a safe place.

Lesson 2: Overview

Tools and equipment in the Automotive Industry

This lesson is about the selection, care and use of key hand tools in the automotive environment.

Learners will be able to identify five simple tools for their basic toolkit, understand what they are used for and appreciate how to look after and store them safely.

In the automotive industry it is important to be trained on how to use and operate all tools and equipment before use, so that you can protect yourself from injury. It is also important to read, understand, and follow the instructions and recommendations described in the operating and maintenance manuals for tools and equipment.

Tools should also be visually inspected for any defects or damage that may affect its safe use. Any defective tools should be replaced immediately.

Learning Objectives

Identifying the tools required for a basic tool kit.
Correct usage of the tool for a given job.
The correct care and use of key hand tools.
Identify the main parts of a car under the bonnet.
Know about the use of the tools in a car toolkit.

Curriculum Links

All vocational areas. Science, Social science, Machines, Simple Machines, Transport, Urban Livelihood, Acid Bases and Salts, Coal and Petroleum, Health and Safety)

Core Skills

Critical thinking, problem solving, communication and teamwork.

Preparation and Resources

You will need pens and activity templates.



Lesson 2: Classroom Activities

TEACHER NOTES

MIND THROTTLE- ACTIVITY 1

Ask learners to identify the tools given in the resource sheet and what they could be potentially used for in the automotive workplace. Discuss the types of PPE you would wear whilst working with the specific tool.

PIT-STOP- ACTIVITY 2

Using the fact sheets provided, discuss the importance of Health & Safety when using the tools in the workplace.

1. Document evidence of/for learning either by taking photographs of students and their work or by making short video stories (30 seconds to 3 minutes) on your smart phone and upload it on the social media (Instagram, Twitter, YouTube, FB Page, V-logs, Blogs etc.).
2. Documenting & sharing your good work help motivate not only your learners & you but also peer educators.
3. A word of caution- Before sharing any photograph/video of any learner, it is advised that a Media Consent Form may be secured from their parents/guardians.

PRACTICAL ACTIVITY

Take the learners out to the School Transport Bay and have one of the drivers help you by showing groups of students how to open the bonnet and the boot of one of the school cars.

Allow the learners to make note of what they observe under the bonnet (the driver would help them identify of the basic car parts under the bonnet).

The car's toolkit should be shown to the learners along with the name and function of every tool in the toolkit. Allow them to see and hold the tools. Discuss the function of every tool in the kit. Make sure all relevant health and safety precautions are taken.

Once back in the class- ask learners (in groups) to revise all that they saw and write in their notebooks in the following format:

Name of the car part	Its location in the car
Name of the Tool (in the car toolkit)	Its function

Learner will be asked to manage a job that must be completed in a workshop.






What tools should they choose to complete the task? The learner will be asked to choose their tools and give a brief description of how they would use it to complete the task.

Instructor will then carry out the task using the appropriate tools. Compare tools chosen by both the learner & instructor and give appropriate feedback.



Lesson 2: Mind Throttle – Activity 1

Identify the basic tools below and what they are used for:



	Name the tool	What is it used for?
		
		
		
		
		

Lesson 2: Pit stop! Activity 2 (Fact Cards)



Using the fact sheets provided, discuss the importance of Health & Safety when using the tools in the workplace.

Hammer		Pliers	
	<p>A hammer is a striking tool and is used for striking surfaces. There are many types of hammer. Select a hammer that is comfortable for you and that is the proper size and weight for the job.</p> <p>In the automotive workplace it has many uses, including hitting a chisel or punch.</p>		<p>Pliers are made in various shapes and sizes and have many uses. Some are used for gripping something round like a pipe or rod, some are used for twisting wires. Some examples of using pliers include installing a stereo head unit, speakers, or wiring new headlights.</p>
	<p>Safety First: Always check for wear, damage or cracks and if broken, please replace. Always concentrate when using a hammer as it can cause injury.</p>		<p>Safety First: Always check for wear, damage or cracks and if broken, please replace. Keep your equipment clean at all times.</p>

Using the fact sheets provided, discuss the importance of Health & Safety when using the tools in the workplace.

Spanner		Socket Set	
	<p>A spanner or wrench is used for turning a nut, bolt or similar fixing. They are generally made from steel and coated in chrome to stop corrosion.</p> <p>This is a double open-ended spanner. It can be used to loosen or tighten bolts or nuts, for example, when changing a wheel.</p>		<p>A socket set is a number of detachable sockets of different sizes for use with a socket wrench.</p> <p>A socket attaches to a socket wrench or torque wrench or other turning tool in order to tighten or loosen a nut or bolt by turning it.</p> <p>They can be used for changing wheels or working on the engine of a vehicle.</p>
	<p>Safety First: Always check for wear, damage or cracks and if broken, please replace. Keep your equipment clean at all times.</p>		<p>Safety First: Even this simple tool can cause hand and finger (knuckle) injuries. Always inspect the socket, extensions and bars and make sure they are not damaged in any way. Replace immediately to avoid injury.</p>

Using the fact sheets provided, discuss the importance of Health & Safety when using the tools in the workplace.

Screwdrivers		Pliers	
	<p>Screwdrivers are made in various shapes and sizes. They are used for turning (driving in or removing) screws. Types include star and flat blade screwdrivers. They are commonly used when working with car engines.</p>		<p>Pliers are made in various shapes and sizes and have many uses. Some are used for gripping something round like a pipe or rod, some are used for twisting wires. Some examples of using pliers include installing a stereo head unit, speakers, or wiring new headlights.</p>
<p>Safety First: Always wear protective equipment when using your toolkit. Do not hammer screws which cannot be turned. Do not try to use screwdrivers on screw heads for which they are not designed. Replace if damaged.</p>		<p>Safety First: Always check for wear, damage or cracks and if broken, please replace. Keep your equipment clean at all times.</p>	

Lesson 2: Pit stop! Activity 3

OVERDRIVE (Discussion Topic)

Open up a discussion with learners by asking them how they would take care of their toolkit. Then summarise the responsibilities of looking after their toolkit using the list under 'Taking Care of My Toolkit'.

Mind Rally (Research Topic)

In case of a minor accident or an injury from the tools that you use in a garage what should be done to deal with it? Think and talk about it in your group. (Teacher should hear all groups and then inform the learners about exercising – safety first (ABC- Always Be cautious), using the first aid kit and informing the doctor.

TEACHER NOTES

Share the following information with your learners.

Taking care of my toolkit

- When you have finished with a tool, you must store it in the correct location.
- Any equipment must be cleaned using an appropriate cloth and cleaning fluid.
- If you have created any debris from working with tools, this must be cleaned as soon as possible.
- All waste must be disposed of at the end of each task and using the correct bins.
- Always check your tools for damage, cracks or breakages and replace immediately.
- At the end of each day store away your toolbox in a safe place in your workshop, so that you are ready to start again tomorrow.



Life skill:

1. What precautions should you undertake while stowing/storing your toolkit?
2. Creating and maintaining a First aid box.

Let's Surf:

<http://www.enduringautomotive.com/top-14-tools/>

<http://www.dummies.com/home-garden/car-repair/how-to-check-your-vehicles-oil-level/>

Lesson 3: Overview

Learning Objectives

Know that vehicles are classified into different categories and know the utility of the vehicle categories.
Be able to group vehicles into specific categories.
Recognise different types of vehicles built in their own country.

Curriculum Links

All vocational areas. (Science, Social science, Machines, Simple Machines, Transport, Urban Livelihood, Acid Bases and Salts, Coal and Petroleum, Health and Safety)

Core Skills

Critical thinking, problem solving, communication and teamwork.

Preparation and Resources

You will need scissors, pens and activity templates.

Types of cars in the automotive industry

This lesson will look at different types of vehicles in the automotive industry and how they are categorized, providing some examples for learners to compare and contrast.

The lesson will give learners the skills required to identify and categorize different vehicle types. They will develop these skills through activities, which can be used in a classroom or in a practical environment.

Since there is no single classification as the cars differ in size, purpose, price, and number of doors, seats and other features. Also, there are different categorizations in many countries across the world. This lesson allows the learners to have a broader look at the most popular car types, dividing them by shape and purpose.

Learners will also be able to understand why it is important to learn skills as well as learning facts.

Lesson 3: Activity 1

TEACHER NOTES

Pit-stop! ACTIVITY 1

Divide learners into groups and ask them to identify the different types of cars in the Activity 1 Worksheet. Compare each vehicle and identify how they are different from each other. For example, number of doors, how many people they can carry, etc. Use the links in Additional Resources to carry out further research about the different types of cars.

Mind Throttle – ACTIVITY 2

Discuss the advantages and disadvantage of different types of cars and write down their findings using the Activity 2 Fact Sheets.

Can they explain which type of car they would like to own one day and why.



Overdrive

Have a discussion about the popular types of cars being built in your own country and the different fuel type vehicles e.g. petrol, diesel, hybrid and electric. Discuss their advantages and disadvantages.

Let's surf:

<https://www.cardekho.com/newcars>

<http://www.allcarsbrands.net/>

<https://www.theaa.com/car-buying/cars-made-in-britain>

<http://www.allcarsbrands.net/>

<http://www.allcarsbrands.net/>

Suggested Partner School Activities

Mind Rally

Discuss car exhaust pollution, what are its long term effects on the following:

Human beings

Plants

Animals

Can you think of ways to overcome/combat this problem? Hint. Hybrid / solar powered cars.

Additional Resources

<http://www.indiamarks.com/car-segmentation-society-indian-automobile-manufacturers/>







<https://www.cardekho.com/features-stories/different-segments-in-indian-auto-industry.htm>

<http://auto.ndtv.com/news/types-of-cars-1450327>

<https://www.cartrade.com/blog/2013/auto-guides/different-car-body-types-494.html>







Lesson 3: Pit stop! Activity 1 (Worksheet)

Identify the types of vehicle below and describe their features

	Type	Describe its features
		
		
		
		
		
		

Lesson 3: Pit stop! Activity 1 (Worksheet solution)



Identify the types of vehicle below and describe their features



	Type	Describe its features
	Mini	A mini car is a small compact car often used for city driving. Depending on the model they can be 2 or 4 door. Very economic in terms of fuel consumption.
	Hatchback	A hatchback is a car with a sloping back and a hinged rear door that opens upwards. They seat four to five people but can have limited space.
	SUV/MUV	A suburban utility vehicle (SUV) or Multi Utility Vehicle (MUV) is one of the larger family vehicles accommodating 5 to 7 people. They are similar to a large estate car and usually equipped with four-wheel drive.
	Saloon/Sedan	Saloons/sedan cars come in all shapes and sizes and are often described as 'three-box' cars – meaning they have an engine bay (box 1), a cabin (box 2) and a separate boot (box 3), compared to a hatchback's two boxes.
	Vans	Vans are vehicles used for transporting goods and equipment. They vary in size but are usually smaller than a lorry and bigger than the standard car.
	Estate	Estate cars are usually similar in design to saloons or hatchbacks except they are longer in length. The boot therefore is bigger and has more storage space.

Lesson 3: Activity 2 (Fact Cards)



Discuss the advantages and disadvantages of different types of cars and write down findings using the Fact Cards below.

Your students could use this and their additional research to create their own versions of the card game Top Trumps. Each card will contain a list of the same numerical data about a different car, and the aim of the game is to compare these values to try to beat them and win an opponent's card.

Mini Cars		Hatchback Cars	
	A mini car is a small compact car often used for city driving. Depending on the model they can be 2 or 4 door. They have become very popular in recent years and you can now get a variety of models on the market.		A hatchback is a car with a sloping back and a hinged rear door that opens upwards. They seat four to five people but it can have limited space.
<p>Advantages – They are very economical in terms of fuel costs. They are easier to park and manoeuvre and provide a fun and different driving experience. They also hold their value on the second hand market.</p> <p>Disadvantages – They have less horse power, so it will take longer to get faster speeds. They may be more dangerous if involved in a car accident. There is less space for drivers and passengers as well as for storage.</p>		<p>Advantages – They have more interior and boot space than a mini car. They are very easy to manoeuvre.</p> <p>Disadvantages – They are quite compact cars, so there is not a lot of space for a larger family.</p>	

SUV/MUV		Saloon/Sedan Cars	
	A suburban utility vehicle (SUV) or Multi Utility Vehicle (MUV) are one of the larger family vehicles accommodating 5 to 7 people. They are similar to a large estate car and usually equipped with four-wheel drive.		Saloon/Sedan cars come in all shapes and sizes and are often described as 'three-box' cars – meaning they have an engine bay (box 1), a cabin (box 2) and a separate boot (box 3), compared to a hatchback's two boxes.
<p>Advantages – There is plenty of space in an SUV or MUV. They are easier to handle in more challenging weather and road conditions. Drivers have more room and additional height to observe road and traffic conditions, therefore improving safety.</p> <p>Disadvantages – They can be expensive to run in terms of fuel costs and replacement parts.</p>		<p>Advantages – Their longer wheelbases traditionally make saloons more comfortable than hatches, and they have much more space in the interior.</p> <p>Disadvantages – Some saloons struggle to offer the same boot space as some larger hatchbacks due to their more awkward boot shape.</p>	

Lesson 3: Activity 2 (Fact Cards)

Estate Cars		Vans	
	Estate cars are usually similar in design to saloons or hatchbacks except they are longer in length. The boot therefore is bigger and has more storage space.		Vans are vehicles used for transporting goods and equipment. They vary in size but are usually smaller than a lorry and bigger than the standard car.
<p>Advantages – Estate cars have a larger boot space, and are popular with larger families.</p> <p>Disadvantages – They can be more expensive to run as they have higher fuel costs due to increased size.</p>		<p>Advantages – They have plenty of room for storage, so many firms and companies use them to store equipment and deliver goods. In the automotive environment, they are a support unit, transporting the various tools need to carry out particular jobs.</p> <p>Disadvantages – They can be expensive to run in terms of fuel costs and replacement parts.</p>	

Lesson 4: Overview

Car parts in the automotive industry

At the end of this lesson, learners will be able to identify the main parts of a vehicle. Learners will also be able to describe the main use of these parts.

The main parts of a vehicle include the following:

- Lights
- Wheels
- Doors
- Bonnet (under the bonnet)
- Boot compartment
- Wipers
- Mirrors
- Steering Wheel
- Brakes (Hand and foot)
- Dash Board Dials

Learning Objectives

To identify and state the function of the main parts under the bonnet of a vehicle.

Curriculum Links

All vocational areas.

Science, Social science- Machines, Simple Machines, Transport, Urban Livelihood, Acid, Bases and Salts, Coal and Petroleum, Health and Safety, Light.

Core Skills

Critical thinking, problem solving, communication and teamwork.

Preparation and Resources

You will need scissors, pens and activity templates, poster of a car.

Life skill:

Why is it important for you to be aware of the various parts of your car?

Let's surf:

<https://homesteading.com/change-tire-safely-homestead-tips/>



Lesson 4 : Activity 1

TEACHER NOTES

Pit-stop! ACTIVITY 1

Divide the learners into groups and ask them to identify the main parts of the car. This activity will require the use of the poster of the car and the Answer Sheet provided in Activity 1 Worksheet.

As the learners to name each car part, and identify the function of that part of the vehicle.

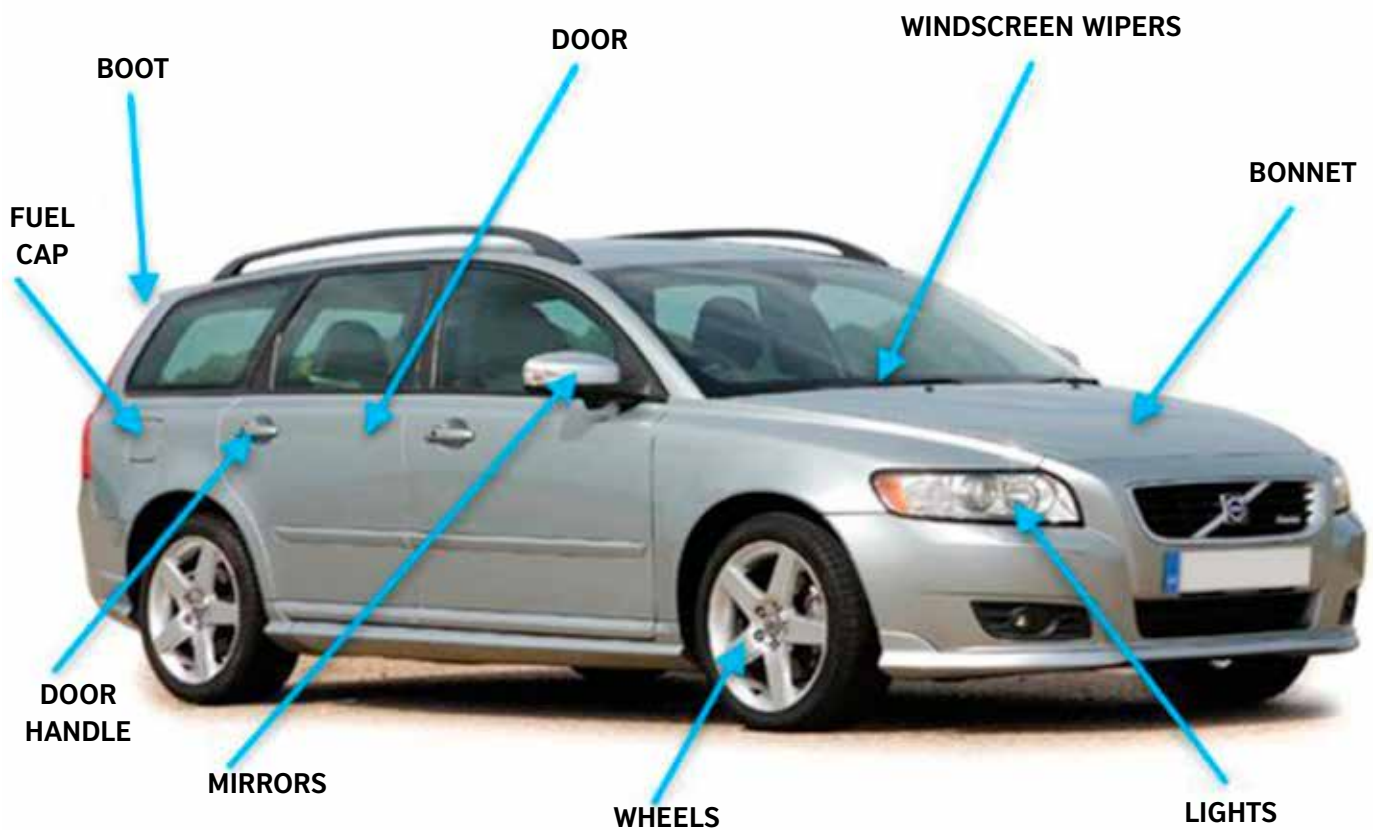


Lesson 4: Activity 1 – Poster

Name the car external parts arrowed below



Lesson 4: Activity 1 – (Poster solution)



Lesson 4: Activity 1 (Answer sheet)

Cut out the answers below and place them on the poster in the correct position.

WHEELS	LIGHTS	DOORS
BONNET	BOOT	DOOR HANDLE
WINDSCREEN WIPERS	MIRRORS	FUEL CAP

Lesson 4: Activity 2

TEACHER NOTES

Pit-stop! ACTIVITY 2

Divide the learners into groups and ask them to discuss the use of given main car part identified in Activity 1.



Using the fact cards provided, explain to the learners how each car part is important.

Lesson 4: Activity 2 (Fact Cards)

Wheels	Boot
<p>Wheels are a key component of a car as without the wheels a car would not be able to move. It is important to have the tyres inflated to the correct pressure. Tyre pressure can change depending on the vehicle type and this information is usually found on the fuel cap of the vehicle.</p> <p>Having the correct tyre pressure will improve vehicle safety and extend the life of your tyre.</p>	<p>The boot or luggage compartment is located at the back of the vehicle. This is the main storage area in a vehicle. The boot usually stores the spare wheel for the vehicle.</p>
FACT – With long journeys tyre pressure can increase so it is important that you do not over inflate the tyre.	FACT – Sitting as a passenger in the boot compartment is dangerous.

Lights	Bonnet
<p>Headlights and taillights are on a vehicle to ensure other road users can see you. It is important to ensure all lights are working correctly and that headlights and taillights are kept clean at all times. Indicator signal lights and brake lights also make other road users aware that you are turning or slowing down.</p>	<p>A bonnet/hood provides access to the vehicle engine. The main liquid components are located under the bonnet, such as windscreen washer fluid, dipstick to check oil level and engine coolant.</p>
FACT – Faulty lights are a huge contributing factor in the majority of road accidents.	FACT – The hood latch handle is usually located below the steering wheel, beside the driver's seat or set into the door frame.

Doors	Windscreen Wipers
<p>All vehicles have doors so that the driver and their passengers can get in and out of the vehicle. When vehicles are not in use, doors can be securely locked to keep the vehicle safe. Doors are usually opened manually, but they can also be powered electronically. Powered doors are usually found on minivans or sports cars.</p>	<p>Windscreen wipers are used to clear rainwater from the windscreen when it is raining. This helps to improve your visibility. It is important to keep windscreen wipers clean.</p> <p>Windscreen wipers need to be replaced regularly on a vehicle.</p>
FACT – Cars can have two doors or four doors.	FACT – The first windscreen wipers were invented in 1903.

Lesson 4: Activity 2 (Fact Cards)

Door Handle	Brakes
The door handle allows vehicle users to gain entry to the vehicle. A door lock can usually be found on the door. This can be locked for security. A door handle can be found on the inside and the outside of the vehicle.	Matter to come
FACT – Door handles are usually made of steel but some vehicle types have chrome door handles.	FACT – TO COME

Steering Wheel	Dash Board
Matter to come	Matter to come
FACT – TO COME	FACT – TO COME

Mirrors	Fuel Cap
Mirrors are used on a vehicle to provide better visibility. There are rear-view mirrors and side view mirrors. The rear-view mirror allows drivers to see what is behind them and side view mirrors allows drivers to have a side view of the side of their vehicle.	The fuel cap helps keeps the fuel in the vehicle after refueling. A fuel cap also helps to protect the fuel inside the fuel tank.
FACT – Mirrors must be adjusted correctly so that you can view both behind your vehicle and to the side of your vehicle.	FACT – Cars need fuel to run. Drivers must check their fuel levels regularly, using a fuel gauge on the dashboard of their car. Don't run out of fuel as it can harm your car.

Lesson 5: Overview

Routine checks in the automotive industry

In this lesson learners will gain knowledge of the main routine checks required to make a vehicle run properly. Learners will examine how to check key elements such as lights, wipers, tyre pressure and oil level and the importance of carrying out these routine checks on a vehicle.

Learners will also gain knowledge of the effects of not carrying out these routine vehicle checks.

The purpose of routine maintenance checks is simple – it is to keep the vehicle in a good working order and in a safe condition to drive. Vehicles need to be regularly serviced and inspected as set out by the manufacturer. It is recommended that a checklist should be used and that you record your findings for future reference.

Learning Objectives

Identification of key parts of an engine, which require regular service. Gain knowledge of the main routine vehicle checks.

Curriculum Links

All vocational areas. Science, Social science- Machines, Simple Machines, Transport, Urban Livelihood, Acid, Bases and Salts, Coal and Petroleum, Health and Safety, Light, Disasters, Pollution

Core Skills

Critical thinking, problem solving, communication and teamwork.

Preparation and Resources

You will need scissors, pens and activity templates.

Life skill:

Prepare a checklist of things to inspect in your vehicle before proceeding on a long road trip.

Let's surf:

<http://www.wikihow.com/Check-Your-Car-Before-a-Road-Trip>



Lesson 5: Activity 1

Servicing and Inspections

It is important to carry out regular servicing and inspections on a vehicle for a number of reasons:

- Ensure the vehicle stays in a safe condition to drive
- Maintain efficiency
- Extend the life of the vehicle
- Reduce running costs
- Limit damage from corrosion

It is important to keep a record of any servicing work that has been carried out on a vehicle. This is known as the vehicle's service history. This records the work that has been carried and when this work was completed.

Pit-stop!

Take your learners to the Bus Bay of the School (along with the person in-charge) and look at one of your school buses Dashboard. Identify the mileage of the vehicle and check for a vehicle service history book. Group interaction with the School's Transport In-charge regarding the common issues faced by the vehicles, servicing and basic safety features.

Mind Throttle

Learners will be required to match the correct labels on the image of Activity 1 Worksheet. Fact sheets are provided for the teacher to explain.

Overdrive

Initiate a discussion on the importance of servicing...

A **time-based service** is where the customer has not covered the mileage in the time recommended between service intervals. The vehicle still needs to be inspected as the age of the vehicle may have an effect on the vehicle parts.

A **mileage-based service** is where the customer drives long distances and accumulates more kilometres on the vehicle. The vehicle will need to be serviced more regularly.

Let's surf:

Information on MOT in the UK and Vehicle Fitness Certificate in India.

<https://www.gov.uk/government/publications/car-parts-checked-at-an-mot/car-parts-checked-at-an-mot>

http://www.delhi.gov.in/wps/wcm/connect/doit_transport/Transport/Home/Vehicle+Fitness/Criteria+for+F-Certificate

Lesson 5: Mind Throttle – Activity 2 (Worksheet)

Cut out the labels and match them with the correct engine parts, by placing them in the correct positions.



**Engine Coolant
Tank**

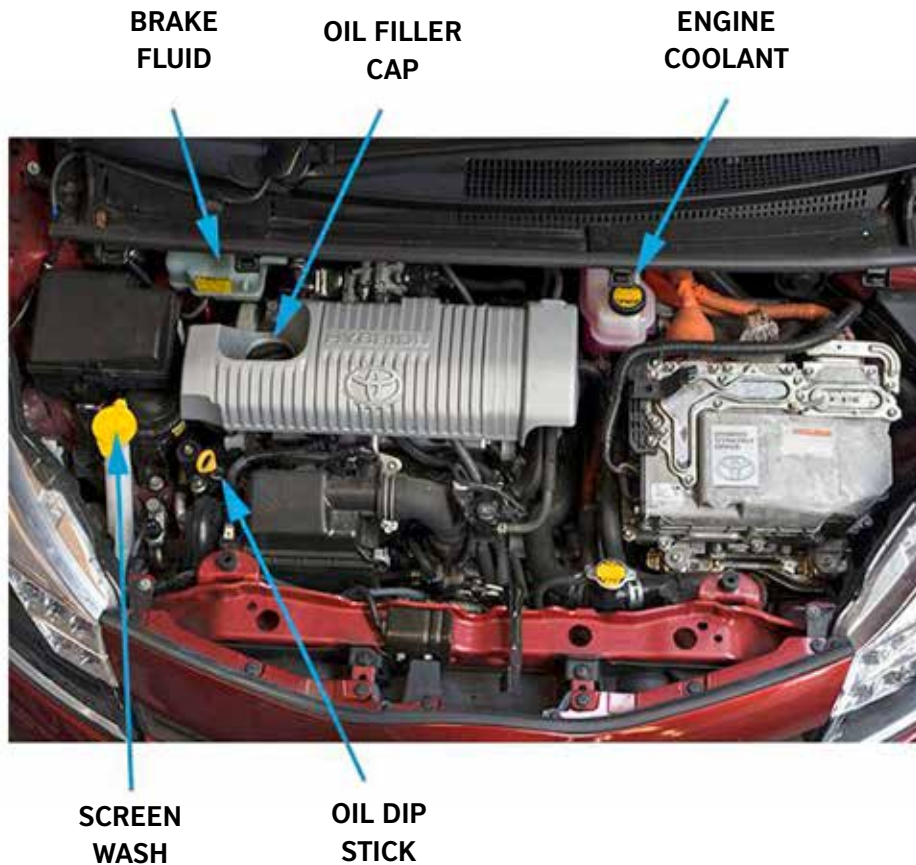
Brake Fluid

Oil Dipstick

Fill Oil Here

**Windscreen Washer
Fluid**

Lesson 5: Mind Throttle – Activity 2 (Worksheet solution)



Lesson 5: Activity 2 (Fact Cards)

Engine Coolant	Engine Oil
If the engine becomes too hot it may cause the engine to stop. This is why engine coolant is used. Engine coolant absorbs heat from the engine. The normal running engine temperature is 90°C.	The main functions of motor oil are to reduce wear on engine parts and also to cool the engine down. It is important to use the correct engine oil for your vehicle. Engine oil helps your vehicle run smoothly and efficiently. Engine oil cools and lubricates the engine.
FACT – Always allow the engine to cool down before adjusting coolant levels. This is because at higher temperatures the coolant is under pressure. If you open the pressure cap, the engine coolant will expand and force boiling liquid over you.	FACT – Sitting as a passenger in the boot compartment is dangerous.

Brake Fluid	Windscreen Washer Fluid
Brake fluid is a liquid used in the braking system of a vehicle. If brake fluid is not changed regularly, it can result in brake failure. This may cause an accident. The brake fluid level must always be between the maximum and minimum marks on the tank.	Windscreen washer fluid is used to keep the windscreen clean. A control in the car can be triggered which releases the windscreen washer. The windscreen wipers turn on when the windscreen washer fluid is used. Windscreen wipers are made of rubber and remove dirt or liquids that may land on your screen.
FACT – Brake fluid should be changed at least every two years.	FACT – Vehicle owners used brushes to clean their windscreens before windscreen washer was available.



Lesson 5: Mind Throttle – Activity 3 (Worksheet)

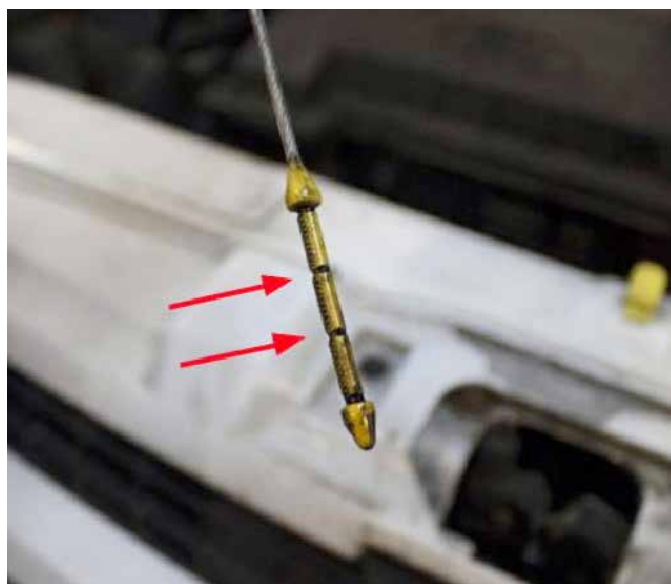
Identify the correct oil level on the dipstick by ticking in the correct box below

☐☐

Lesson 5: Mind Throttle – Activity 3 (Worksheet solution)

TEACHER NOTES

The correct answer is Picture A. Look at the picture on the right; you will see the correct oil level must be between the two markers on the dipstick.



(Correct Answer)
(Picture showing two markers on dipstick)

Lesson 5: Mind Throttle – Activity 4 (Worksheet)

Identify the correct tyre pressure by ticking in the correct box below

☐☐

Lesson 5: Mind Throttle – Activity 4 (Worksheet solution)

TEACHER NOTES

The correct answer is Picture B.



(Correct Answer)

Lesson 5: Activity 5 (Fact Cards)

Engine Oil	Tyre Pressure
<p>If you did not replace the engine oil on a vehicle it would have the following impact:</p> <ul style="list-style-type: none"> • Engine wear and tear • Engine damage • Overheat the engine • Clog filters in the vehicle 	<p>Driving a vehicle with incorrect tyre pressure may cause the following:</p> <ul style="list-style-type: none"> • Less grip • Increased braking distance • Increased fuel consumption • Reduced lifespan of the tyre • Reduced handling of the vehicle
<p>Question – What is the correct oil level in a vehicle? How do we measure engine oil levels?</p>	<p>Question – What is the optimum tyre pressure? In which unit is tyre pressure measured? Does the tyre pressure vary on the type of cars?</p>

MIND RALLY

As tyre temperature increases, the tyre pressure increases. Therefore, it is important that you do not over inflate the tyre.

Windscreen Wipers	Windscreen Washer
<p>If you do not change windscreen wipers regularly this will result in the following:</p> <ul style="list-style-type: none"> • Reduced visibility • Damage to your windscreen 	<p>If you do not use windscreen washer regularly this will result in the following:</p> <ul style="list-style-type: none"> • Reduced visibility • Dirt on your windscreen

Brake Fluid	Lights
<p>If you do not refill your brake fluid regularly this will result in the following:</p> <ul style="list-style-type: none"> • Brake failure • Increased braking distance 	<p>If your lights are not working correctly on your vehicle this will result in the following:</p> <ul style="list-style-type: none"> • Reduced visibility • Other road users may not be able to see you
	<p>Question – How is it possible to improve safety at night by reducing blinding effect of opposing cars headlights? Can having multiple low intensity lights be an option? Can the head light levels be an option?</p>

Lesson 5: Information on regular maintenance checks

Regular Maintenance Checks

TYRES:

Check the tyre pressure on your vehicle every two weeks. Look out for tyre wear and cracks. If your tyre pressure is low, add more air to your tyre. If your tyre is over inflated let some of the air out of the tyre as this may damage the tyre.

ENGINE OIL:

Every couple of weeks, check your engine oil level. Also, before taking a long journey check your engine oil level. If your engine oil level is low, add more oil. Make sure to use the correct engine oil for your vehicle.

WATER:

Check your water levels on a weekly basis and make sure the water level is between the MAX and MIN marks. If your water levels are low add more water to the vehicle.

WINDSCREEN WIPERS:

Clean your windscreen wipers with a cloth regularly. Replace windscreen wiper blades every year.

WINDSCREEN:

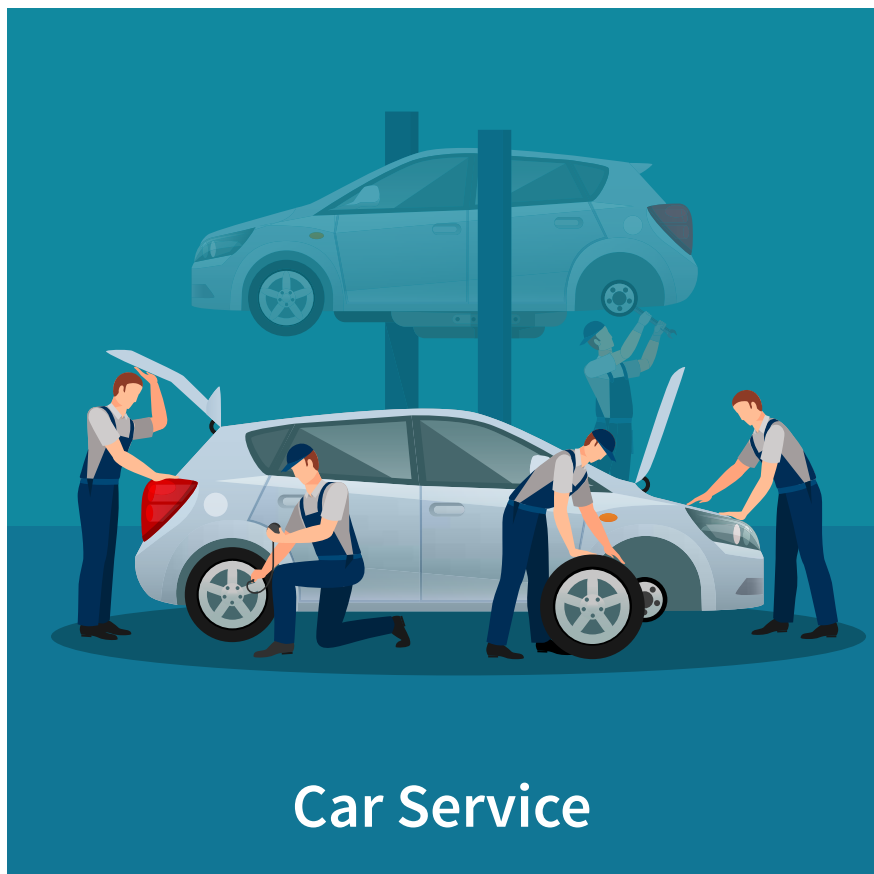
Check regularly for stone chips or damage. If there is any damage, get this repaired immediately.

WINDSCREEN WASH:

Top up your windscreen washer regularly. Add some windscreen wash to your vehicle if it is low.

LIGHTS:

Check your lights once a week, including indicators, reversing lights, brake lights and front lights. Replace any broken lights immediately as broken lights reduce your visibility and the ability for other road users to see you.



Car Service

Lesson 5: Information on regular maintenance checks

MOT – WHAT IS IT?

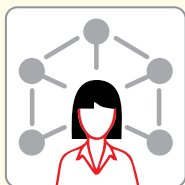
In the UK, all vehicles must pass an MOT (Ministry of Transport) test. This test takes place every year and tests the safety of the vehicle. During the MOT test important parts of the vehicle such as lights, steering, brakes, tyres and wheels, seat belts, exhaust, fuel, emissions and body structure.

Every vehicle over three years old needs to pass this test. If any of the above parts of the vehicle do not function correctly, the vehicle will fail the test. The vehicle cannot be driven on the road without a valid test certificate.

CERTIFICATE OF FITNESS – WHAT IS IT?

In India, all new private vehicles must obtain a Certificate of Fitness from the Department of Transport. This is valid for 15 years and then has to be renewed every 5 years. For new commercial vehicles, a Certificate of Fitness is issued for a period of two years and then has to be renewed annually.

Life skill:



Ask the learner to get a copy of the certificate of fitness of their car and ask them to find out the criteria of fitness for a light vehicle and heavy vehicle in India.

Note: In case the learners are unable to procure – a copy of a Fitness Certificate of a heavy and light vehicle can be procured from School Transport Incharge as a teaching aid.

We have developed this icon for “Life skill”, if approved, this can be used everywhere



Lesson 5: Pollution

Emissions

All vehicles create emissions. The main emissions produced by vehicles are carbon dioxide, carbon monoxide, oxygen, hydrocarbons and nitrogen. Vehicle manufacturers have put a great deal of work into reducing the pollution levels caused by vehicles.

During the annual MOT inspection, exhaust emissions are tested to make sure they conform to legislation. Petrol engines are tested using an exhaust gas analyser that measures the quantities of gas emissions. Diesel engines are tested for the amount of smoke produced at the exhaust pipe.

In India, a Pollution Under Control (PUC) certificate is issued to certify that vehicle meets the emission and pollution controls. All vehicles must have a PUC.



OVERDRIVE

Find out the emissions limits of a current basic emissions test.

What effect does car exhaust emissions have on germination rate and seeding growth of plants?

Discuss the issues relating to the scandal in 2015, when the Environmental Protection Agency (EPA) found that many VW cars had software fitted in diesel engines that could detect when they were being tested, changing the performance accordingly to improve results.

Lesson 6: Overview

Career pathways in the automotive industry

This lesson will look at career pathways for learners in the automotive industry. The lesson will also explore case studies from local, national and international competitions (both UK and India based) and the qualifications required.

Learners will gain knowledge of what it takes to participate in competitions at local, national and international level.



Learning Objectives

Explore potential career pathways in the automotive industry. Explain the qualifications required for a career in the automotive industry.

Curriculum Links

All vocational areas. Science, Social science – Machines, Simple Machines, Transport, Urban Livelihood, Acid, Bases and Salts, Coal and Petroleum, Health and Safety, Light, Industry, Human Resources, Woman and Reform.

Core Skills

Critical thinking, problem solving, communication and teamwork.

Preparation and Resources

Computer with internet connection, projector screen.

Let's surf:

Show a video of the production of a luxury car like a Rolls Royce

(<https://www.youtube.com/watch?v=TRAof9NGmC0>)

Another video of a mass produced car like Tata vehicles

(https://www.youtube.com/watch?v=sD_ixDRrX3s)

Discuss the differences in the means and ways of production.

Lesson 6: Activities

TEACHERS NOTES

Pit-Stop! ACTIVITY 1

Ask learners to read the case studies from the UK and India and discuss the different careers that are available in the automotive industry. If possible invite someone who works in the automobile industry into school to talk to about their career path, the reasons that they went into their job and the skills and qualities they need to be successful.

Mind Throttle: ACTIVITY 2

Explore the web links provided to find out more information about careers in the automotive industry.

Please find the video link below, which demonstrates a competition environment.

<https://www.youtube.com/watch?v=ykncOSUL2PQ>



Lesson 6: Mind Rally – Student Case Study 1



Name: **Conor McGaughey**

Age: 24

Courses studied: Level 3 Apprenticeship in Light Vehicle Repair

Current employment: Lecturer in Motor Vehicle. Studies at South West College

Thoughts on your educational journey:

I was offered the opportunity to train with the SWC motor vehicle team to compete in the UK Regional competitions

in June 2015, I was determined to become the best automotive apprentice in the UK. Having secured 1st place in this competition, I continued my training during the summer to compete in the UK Auto tech finals in November 2015 where I secured 1st place and the Gold Medal. My time at South West College was very enjoyable and my lecturers gave me the opportunity to achieve my best. I have now been working as a technician for just over three years and I've enjoyed learning in a challenging workshop where I get the opportunity to develop skills on a range of high-end performance vehicles.

Advice for potential students:

Show a positive attitude and a willingness to learn new skills. When completing the vehicle maintenance and repair courses I would have to say that the effort you put into your training will be matched by the lecturing staff. They are there to give you the best on the job training, which will develop you into a top technician.

Moving forward:

Entering skills competitions helps to build upon your skills and gives you more confidence when working in the industry. It will give you the opportunity to work with talented people to be the best. It also provides an opportunity to see and work with the latest technologies in the industry.

Lesson 6: Mind Rally – Student Case Study 2



Name: **Cathal Brough**

Courses studied: Level 2 Diploma in Heavy Vehicle Repair, Level 3 Apprenticeship in Heavy Vehicle Repair (HVR).

Currently studying: Level 4 Advanced Diagnostic Techniques

Current employment: IB. McCaffery & Son, Derrylin

Thoughts on your educational journey:

I started my apprenticeship with an employer in the summer of 2013 and they proposed that I go to college to study for Level 2 HVR. At college they were equipped with the most advanced range of lorries and rigs to learn and practice on. I thoroughly enjoyed the course and the tutors were extremely helpful. I achieved Level 2 HVR in June 2015 and I returned to do Level 3. During that year I competed in the Inter Campus Skill Build competition and came first. I also won the 2016 Northern Ireland Auto Skills Heavy Vehicle champion. I have progressed well in my career and am currently undertaking the Level 4 in Advanced Diagnostic Techniques.

Advice for potential students:

When completing the Heavy Vehicle Maintenance and Repair Course (HVR), the course content and the dedicated and knowledgeable staff gave me the best possible start to my career.

Lesson 6: Mind Rally – Student Case Study 3



Name: **Lewis Hamilton**

Career: Formula One Racing Driver

Background:

Lewis Hamilton is a British Formula One racing driver. Lewis currently races with the Mercedes AMG Petronas team and has won the Formula One World championship three times. Lewis won his first championship title with McLaren in 2008 before he moved to Mercedes and won back to back championship titles in 2014 and 2015.

Lewis started his career at the age of 8, when he began karting where he quickly started to win races. He was then signed up by McLaren and Mercedes to the Young Drivers Support Programme. Lewis won the British Formula Renault, Formula Three Euroseries and GP2 championships before making his debut for McLaren in Formula One racing in 2007.

Lewis was the youngest Formula One champion when he won the Formula One championship in 2008. He also became the first British driver to win consecutive Formula One titles in 2014 and 2015. He currently has more race victories than any other British driver in the history of Formula One.

Tool kit culmination activities

MIND THROTTLE

Ask the learners to give a JAM (just a minute) oratory presentation on their favourite car/ automobile and the key things they have learned during this project.

PIT-STOP!

Split the class into 4 groups and name them Autobots, Mechatrons, Autotrons, Mechabots, Speedsters, Rovers etc.

Or let them pick names for their teams (The names should be related to the automobile industry.)

Ask each team to create a QUIZ (10 questions) based on the SIX LESSONS in this Tool kit (you will have 40 questions, create some more to increase the learning level) and pop a quiz for all learners to enjoy!

<http://www.triviachamp.com/General-Car-Trivia-Questions.php>

PIT-STOP!

Divide your class into 4 groups and ask each group to design a 'Car/Vehicle of the Future' collaboratively, on a design board. Have the entire class' Automobile Technology Toolkit work displayed in the School hallway as an exhibition along with their design boards for the car of the future.

ADDITIONALLY you may encourage your learners to design a model of a car using recycled material only.

Lesson 6: Mind Rally – Student Case Study 4

WOMEN IN THE AUTOMOTIVE INDUSTRY

The automotive industry is predominantly male-oriented. Women have been involved in the industry for years but have until recently rarely made it to the forefront. The EU average is 15% of female participation in the automotive industry. While gender diversity in the auto industry is lower compared to other industries like IT and service, changes are happening.. Women today have better education and have more qualifications than in the past to work in more male-dominated industries.

Barb Samardzich is one woman who has taken great strides in the industry and is now the COO (Chief Operating Officer) of Ford of Europe. Barb is the former Head of Product Development in Ford and is one of a few women who hold a key position in the motor industry. Mary Barra is also another female who holds a senior position in General Motors. Mary Barra has placed herself in the history books as the first female CEO of a major global automaker.

Another woman who has changed the automotive industry is Maria Costello. Maria has competed in many motorcycle races including some of the most dangerous races in the world. Maria has picked up a number of injuries during her career and has broken 20 bones throughout her competitive racing career. In 2004 she set a Guinness World Record as the fastest woman to lap the Isle of Man TT at an average speed of 114.73mph.



Mind Rally

Can you find out about other women who work in the automotive industry?

Overdrive

Discuss attitudes towards gender in different careers

<https://www.youtube.com/watch?v=Qyg8XTuRvZc>

Let's surf:

Video documentary of Alisha Abdullah (<https://www.youtube.com/watch?v=L3voukW4030>)

OR

https://en.wikipedia.org/wiki/Bani_Yadav

Lesson 6: Becoming a Mechanic

How to become an automobile mechanic in India

If you are training to work in the automobile industry in India, training varies from 6 months to 2 years, depending on the requirements of the trade.

Curriculum for these training courses is set by the National Council for Vocational Training (NCVT).

One can begin a course in automobile mechanics from as early as 8th grade, depending upon the course.

Admission to new courses takes place in August every year. When trainees have completed their training period they are required to sit the All India Trade Test, which is conducted by the National Council for Vocational Training (NCVT). Successful candidates are awarded a National Trade Certificate, which is recognised by the Government of India.

70% of the training is practical with the remaining 30% theoretical based training relating to Trade theory, workshop calculation and science.

Training is charged at a nominal fee. This provides trainees with access to a library, sports and medical facilities.

Trainees who complete their training with NCVT are professionally qualified to work in the following areas:

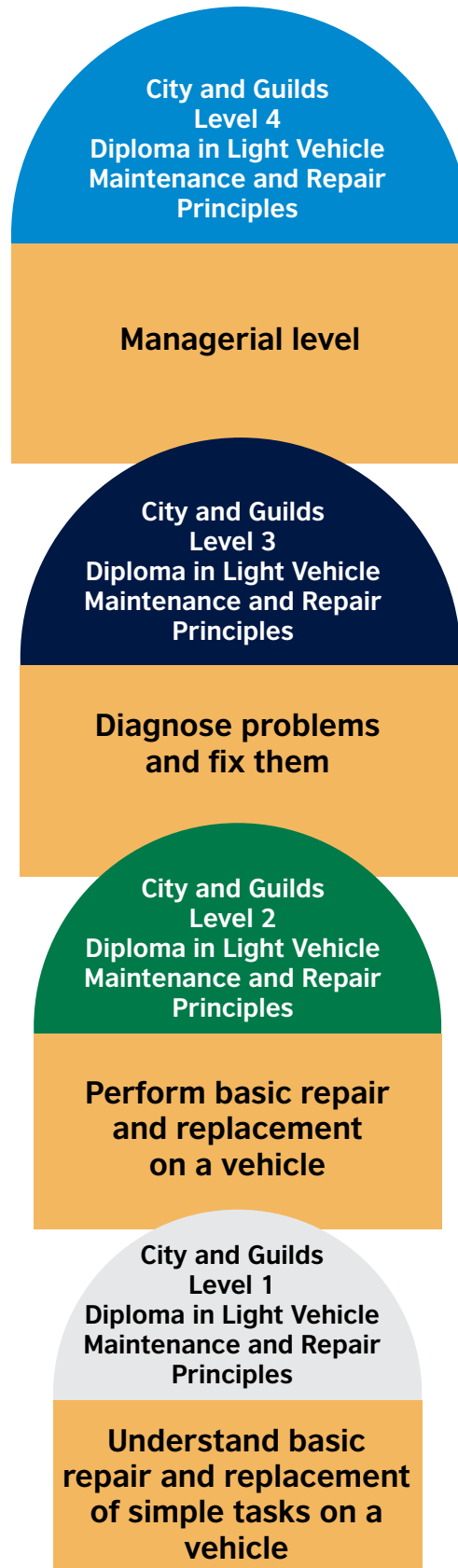
- Auto Diesel engine Mechanic
- Diesel Engine Service Technician
- Auto Fitter in Manufacturing Concern in Assembly Shop or Test Shop
- Mechanic in Auto Manufacturing Industry
- Dealers service mechanic
- Driver/Vehicle Operator
- Laboratory Assistant
- Spare Parts Sales Assistant / Manufacturers' Representative
- Automobile Mechanic
- Diesel Fuel System Service Mechanic
- Vehicle Operator
- Spare Parts Salesman
- Spare Parts Dealer
- Auto Electrician

On successful completion of the course trainee can get themselves enrolled in Apprenticeship training in reputed Industrial organisation. Further they can pursue a technical diploma or a degree in automobile or mechanical technology.



Lesson 6: Courses and Progression

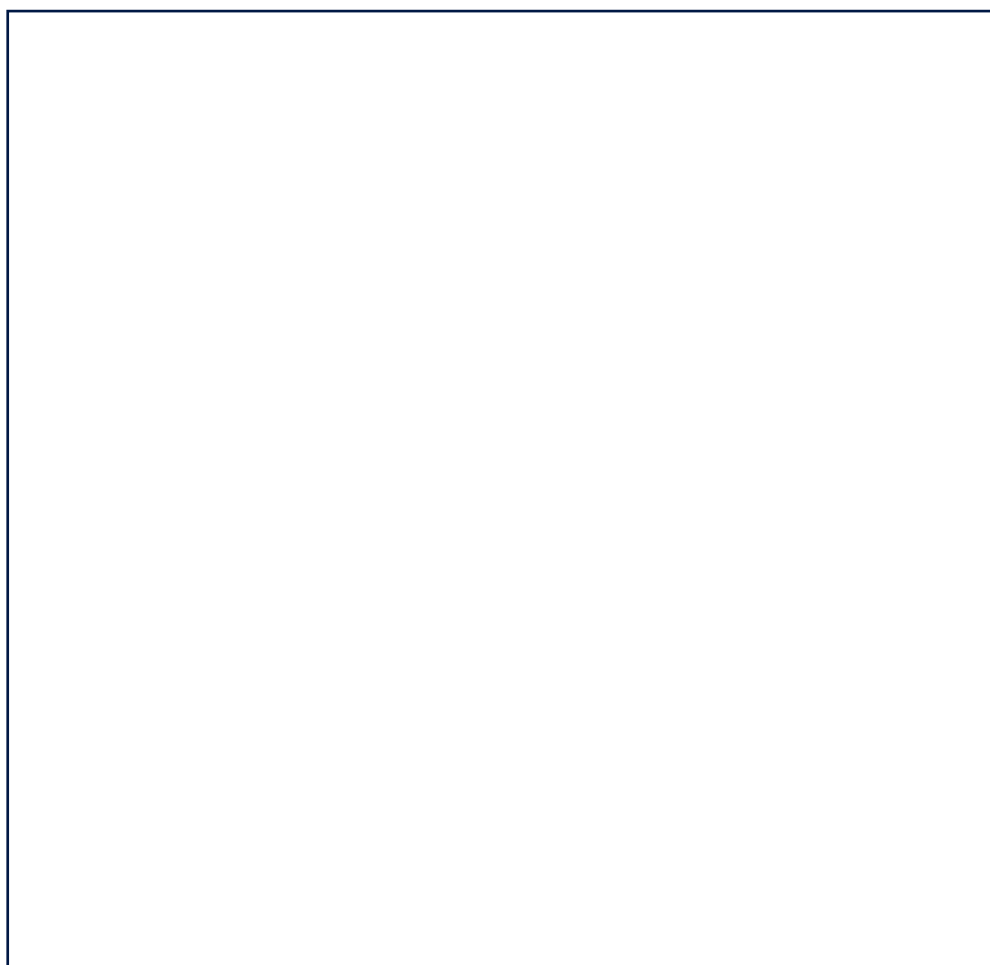
Here is a list of courses available within the Automotive Technology area:



Lesson 6: Mind Throttle – Automotive Industry Careers Word Search

The following activity is taken from the *World Skills Career Planning Toolkit* produced by WorldSkills UK and The Careers & Enterprise Company to help your students develop career planning and employability skills and prepare them for career success.

Using 'Post-it' notes, ask students to list the skills they think are most useful in school, work and life. They can then share their thoughts with another student and note which ones are the same/similar. Using the skills provided, create a group 'inspiration' wall in the room – other words may be added as time passes or words may be moved to another heading. You will need to explain that the headings are the main skills employers look for when recruiting. Alongside these are the 'personal' skills that employers value such as motivation, confidence, resilience, persistence and enthusiasm. Add these to the wall. Students could then think about where and when they are using the employability skills in their day-to-day life and consider how they may develop them further in working towards their ambitions/goals.



Find out more

We hope your learners have enjoyed the content in this teaching toolkit. Explore the links below to find out more about the automotive industry and career development.

<http://www.theimi.org.uk/careers>

<http://www.autocity.org.uk/>

<https://youtu.be/72C1iQVQSCM?list=PLApwP5AQBCzeBmwqBUVJJAE2gxhIchWBB>

<https://www.worldskillsuk.org/media/3750/toolkit-with-powerpoint.pdf>

Case Study 5

Meet Naina



An MSIL-IIT success story...

Naina is 21 years old. Eldest of four children. Lives in an urban cluster in Rohini, Delhi. Naina's father is an electrician... Naina loves martial arts! Her *fascination for cars* was notable... She was *unclear about her life* until she saw an advertisement of the motor mechanic vehicle course at a Maruti Suzuki supported Industrial Training Institute (ITI) in Pusa, Delhi.

Naina became one of the first girls to take admission in the niche Auto Body Repair course by Maruti Suzuki.



Case study 6: Dreaming big with India's first trained female auto mechanic

24-year old Poonam Singh is the only girl in her village Timakiya, on Baghpat road in Meerut, Uttar Pradesh, who wears “trousers” (literally) and does not cover her head with a veil as she heads out to work in a Maruti Suzuki dealer outlet, doing a job men do. She has many firsts to her credit. Not only is she the first girl in the country to complete her automobile mechanic course followed by an apprenticeship from the government-run Industrial Training Institute (ITI), going on to win a President's Award for the same, but also the first girl in the family to have a “company” job.

She earns a fixed salary of Rs. 12,000 a month (add date when written) plus incentives based on her performance. She has bright prospects in a region where structured jobs are hard to come by and this is even more challenging for girls. As Supervisor, her job entails assessing every car that enters, ensuring it is serviced properly and handling client queries on delivery. She is passionate about her job and wants to learn more about vehicles and machinery. She acknowledges that she was fortunate to be part of the 2nd Maruti Suzuki supported batch, which benefitted from upgraded infrastructure and value added inputs aligning students like her, more strongly to industry needs. Trained on the latest cars and systems, with practical experience, factory visits, interaction with engineers/managers and a strengthened curriculum, the ITI is becoming a go-to place for many boys and girls from lesser privileged homes wanting a job in the auto industry.

“I have always done things girls typically do not do. Machines interest me and my experience at the ITI has further fuelled my interest in cars and auto parts.”

Poonam Singh, Supervisor,
Mann Service Center,
Meerut

Additional Resources

Lesson Plan 1: Health & Safety Guidelines

UK – <http://www.hse.gov.uk/toolbox/ppe.html>

India – http://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---lab_admin/documents/instructionalmaterial/wcms_537874.pdf

<http://www.bbc.co.uk/schools/gcsebitesize/design/textiles/consumersmaintenancehealthrev3.shtml>

Lesson Plan 2: Tools & Equipment in the Automotive Industry

<http://www.enduringautomotive.com/top-14-tools/>

Lesson Plan 3: Types of Cars in the Automotive Industry

<http://www.indiamarks.com/car-segmentation-society-indian-automobile-manufacturers/> <https://www.cardekho.com/features-stories/different-segments-in-indian-auto-industry.htm> <http://auto.ndtv.com/news/types-of-cars-1450327> <https://www.cartrade.com/blog/2013/auto-guides/different-car-body-types-494.html> <http://www.allcarsbrands.net/popular-sports-car-brands-in-the-world/> <https://www.cardekho.com/newcars> <https://www.theaa.com/car-buying/cars-made-in-britain> <http://www.allcarsbrands.net/>

Lesson Plan 4: Car Parts in the Automotive Industry

<http://www.odometer.com/o/19-basic-car-parts-you-should-know>

<http://blog.rac.com.au/2014/09/top-10-common-car-parts-use/>

<http://auto.howstuffworks.com/car-parts-roundup.html>

Lesson Plan 5: Routine Checks in the Automotive Industry

Information on what is checked at an MOT in the UK and that is checked to obtain a vehicle Fitness Certificate in India. <https://www.gov.uk/government/publications/car-parts-checked-at-an-mot/car-parts-checked-at-an-mot> http://www.delhi.gov.in/wps/wcm/connect/doit_transport/Transport/Home/Vehicle+Fitness/Criteria+for+F-Certificate

Lesson Plan 6: Career Pathways in the Automotive Industry

<http://www.theimi.org.uk/careers>

<http://www.autocity.org.uk/>

<https://youtu.be/72C1iQVQSCM?list=PLApwP5AQBCzeBmwqBUVJJAE2gxhIChWBB>

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