GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

REMOTE LEARNING ACTIVITY BOOK

(RELAB)

SUBJECT: AUTOMOTIVE

GRADE: 11

LEARNER ACTIVITY BOOK

GGT2030
GROWING GAUTENG TOGETHER

INTRODUCTION AND PURPOSE OF THE RELAB

The Covid 19 pandemic has caused serious impact to schooling resulting in major learning loss and instructional time. This scenario has resulted in school implementing rotational timetables-where learners attend school on alternate days or weeks. The Remote Learning Activity Book was conceptualized to engage learners in constructive learning on days they are at home. Hence the RELAB was developed as a strategy to enhance remote learning.

The RELAB is underpinned by the following Legislative demands:

a) Responding to GDE Strategic goal 2 promoting quality education across all classrooms and schools
b) **DBE Circular S13 of 2020** the requires the GDE to support the implementation of the Recovery Annual Teaching Plan (RATP)
c) **GDE Circular 11 of 2020** requiring districts to issue Learning Activity Packs to support schools for lockdown learning. Understanding learning constraints at home as majority of learners do not have access to devices or data to use for online learning. Many households are depending on schools to provide them with learning resources packs

RELAB is designed as workbook with activities based on the Revised Annual Teaching Plan. The exercises are pitched at a standard to expose learners at Grade 10 & 11 to content at different cognitive levels. The NSC diagnostic reports in different subjects have revealed that learners fail to analyse questions and as a result fail to respond accordingly.

The RELAB is intended to ensure that learners work on exercises that consolidate and reinforce topics taught while at school. These exercises are be completed at home and would receive feedback as groups or individually when at school. It is therefore of paramount importance that teachers assess the work with learners in class, as a way of providing constructive feedback. Teacher are also required to diagnose learner responses, remediate where necessary and plan further intervention.

Educators are encouraged to create whatsapp groups to remind learners on what is expected of them in a particular week/ day(s). Effective utiisation of the RELAB activity book would further ensure that all topics in the RATP are covered simultaneously. Feedback from learners at home will confirm usage of the RELAB material and assist to prepare learners for formal assessments.

Topics- Grade 11 Automotive

1. **Safety – Generic**
2. **Tools – Generic**
3. **Engines- Generic**
4. **Engines- Specific**
5. **Systems and Control – Specific (Mechanical)**
    - **Drive Systems**
    - **Brake systems**
    - **Axles& Steering systems**
    - **Suspension layouts**
6. **Systems and Control – Specific (Electricity)**
7. **Maintenance - Generic**
8. **Forces- Generic**
9. **Terminology- workshop layout**

TERM ONE

SAFETY-HIV/AIDS Worksheet Grade 11

1) Write an essay (not more than 250 words) about your understanding around the following issues about HIV/AIDS:
    - Your understanding about the illness and its causes
    - How it affects our community and specially in the workplace
    - How to prevent HIV/AIDS
2) Write a short paragraph why you think if it is important to know your status. (Not more than 80 words.
3) In your opinion, why do you think it is important to have first aid kits?
4) Name at least 10 basic contents that must be in a first aid kit.

Worksheet Lesson 2

First aid multiple choice questions

1) How should you open the airway of an unconscious casualty?

A. Head tilt and chin lift.

B. Jaw thrust.

C. Head tilt and jaw thrust.

D. Lift the chin.

2) How long would you check to see if an unconscious casualty is breathing normally?

A. No more than 10 seconds.

B. Approximately 10 seconds.

C. Exactly 10 seconds.

D. At least 10 seconds.

3) You are a lone first aider and have an unconscious non-breathing adult, what should you do first?

A. Start CPR with 30 chest compressions.

B. Give five initial rescue breaths.

C. Call 911/112 requesting AED (defibrillator) and ambulance.

D. Give two initial rescue breaths.

4) Which is the correct ratio of chest compressions to rescue breaths for use in CPR of an adult casualty?

A. 2 compressions : 30 rescue breaths.

B. 5 compressions : 1 rescue breath.

C. 15 compressions : 2 rescue breaths.

D. 30 compressions : 2 rescue breaths.

5) Which of the following is the correct sequence for the chain of survival?

A. 911/112. CPR. Defibrillation. Advanced care.

B. CPR. Defibrillation. 911/112. Advanced care.

C. Defibrillation. CPR. 911/112. Advanced care.

D. Defibrillation. 911/112. CPR. Advanced care.

6) What is the cause of angina?

A. Insufficient blood reaching the lungs.

B. Insufficient blood reaching the brain.

C. Insufficient blood reaching the heart muscle.

D. Insufficient blood reaching the leg muscles.

7) What should a casualty with a severe allergy carry at all times?

A. Insulin.

B. Acetaminophen/Paracetamol.

C. Adrenaline (Epipen).

D. Aspirin.

8) Which test should you use if you suspect that a casualty has had a stroke?

A. Face, Arms, Speech, Test.

B. Alert, Voice, Pain, Unresponsive.

C. Response, Airway, Breathing, Circulation.

D. Pulse, Respiratory Rate, Temperature

9) Which of the following can cause a stroke?

A. A blood clot in an artery in the brain.

B. A blood clot in an artery in the heart.

C. A blood clot in an artery in the leg.

D. A blood clot in an artery in the lungs.

10) What should your first action be when treating an electrical burn?

A. Ensure that the casualty is still breathing.

B. Wash the burn with cold water.

C. Check for danger and ensure that contact with the electrical source is broken.

D. Check for level of response.

11) What is an open fracture?

A. A fracture in which the bone ends can move around.

B. A fracture in which the bone is exposed as the skin is broken.

C. A fracture which causes complications such as a punctured lung.

D. A fracture in which the bone has bent and split.

12) Which medical condition will develop from severe blood loss?

A. Shock.

B. Hypoglycaemia.

C. Anaphylaxis.

D. Hypothermia.

13) What names are given to the three different depths of burns?

A. Small, medium and large.

B. First, second and third degree.

C. Minor, medium and severe.

D. Superficial, partial thickness, full thickness.

14) What is a faint?

A. A response to fear.

B. An unexpected collapse.

C. A brief loss of consciousness.

D. A sign of flu.

15) What steps would you take to control bleeding from a nosebleed?

A. Sit casualty down, lean forward and pinch soft part of nose.

B. Sit casualty down, lean backward and pinch soft part of nose.

C. Lie casualty down and pinch soft part of nose.

D. Lie casualty down and pinch top of nose.

Worksheet – Grinders

- When working with an angle grinder, you must follow safety rules. Name six.
- Name five safety precautions to observe when working with a grinding wheel.
- Name five steps to follow when installing a grinding wheel.
- Name five safety precautions to remember when working with a surface grinder.

Worksheet

- When working with a portable drilling machine, you must adhere to safety rules. Name six.
- Name five safety precautions to follow when working with a drill press.
- Power saws are dangerous power tools. Name five safety precautions that must be observed when working with them.

Worksheet – Press machines

1. Discus how the OHS act 85 of 1993 regulates the safeguarding of press machines.
2. Give 4 examples of how press machines can be safe guarded.

Worksheet – Lesson 7

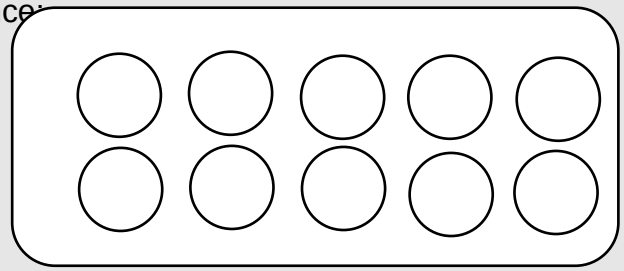
1. Name four safety precautions to observe when working with an arc welding machine.
2. Name six safety precautions to he observed when welding with a gas welding apparatus.
3. Which nine particulars must be visible on a gas cylinder?
4. Name five precautions when handling gas cylinders.

Worksheet – Lesson 8

1. A hydraulic press is an important tool in the workshop. Name eleven precautions to observe when working with this equipment.

ACTIVITY 5

Grade 11	Term: 1	Week No:	**4**	Class	
Topic: Tools	**Combustion chamber designs**				
Learner:	• Complete work sheet below using measuring equipment and engine components				

Instructions	**Record of work completed**
1. Use a dial indicator and do various measurements. Record these measurements in opposite column 2. Use telescopic gauges and an outside micrometre to measure the bore of and engine. Measure top just below ring groove. Measure bottom and compare two readings 3. Torque a cylinder head in the correct sequence. • Draw the sequence you would use in opposite column. 4. Do various measurements with a vernier calliper.	1. Run-out on a shaft/disc: Reading: _____ 2. Bore measurement: Top: _____ Bottom: _____ Difference if any: _____ 3. Specifications of engine head to be torqued: Engine used: _____ (Example: Ford 1600) Nm _____ • Sequence:  4. Readings: Name each item that was measured (Example Big end journal)

	Name: _____ Measurement: _____ Name: _____ Measurement: _____ Name: _____ Measurement: _____

ACTIVITY 6

Grade 11	Term: 1	Week No:	**5**	Class	
Topic: Tools	**Combustion chamber designs**				
Learner:	• Complete work sheet below				

Instructions	**Record of work completed**
Draw a sketch of the following types of combustion chambers: 1. Combustion chamber in piston	1.
2. Pre combustion chamber	2.
3. Explain the difference between direct and indirect injection	3.

Direct Injection	**Indirect Injection**
1.	1.
2.	2.
3.	3.
4.	5.

ACTIVITY 7

Grade 11	Term: 1	Week No:	**5**	Class	
Topic: Engines	**Injectors**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Define the function of an injector.	1. ______________________________ ______________________________ ______________________________ ______________________________.
2. Dismantle a mechanical injector. Investigate and inspect all the components to have a thorough understanding of its operation. **Describe the operation in point form.**	2. ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________ ______________________________.
3. Which factors in an engine design will determine the type of	3. ______________________________ ______________________________ ______________________________

injector nozzle to be used?	_____ _____ _____ .
4. Why are glow plugs sometimes used with diesel engines?	4. _____ _____ _____ _____ .
5. Explain how a Piezo injector is activated to inject fuel	5. _____ _____ _____ _____ _____ _____ _____ .

ACTIVITY 8

Grade 11	Term: 1	Week No:	**6**	Class	
Topic: Engines	**Valve assemblies**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Draw labelled sketches of the following valve arrangements: **a. L-head** **b. I-head**	1. **a.** b.
2. Why is an **I-head** valve assembly less efficient than a **W-head** arrangement?	2._____ _____ _____ _____ _____ __ .
3. Where is the camshaft placed on an I-head engine?	3._____ _____ _____ _____ .

ACTIVITY 9

Grade 11	Term: 1	Week No:	**6**	Class	
Topic: Engines	**Camshaft arrangements and followers**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. List the types of camshaft arrangements that are available in the automotive workshop. 2. Explain where each camshaft is mounted in the engine. (E.g. 1.1 and 1.2 must match)	1. 1.1 _____ ____ . 1.2 _____ ____ . 1.3 _____ ____ . 1.4 _____ ____ . 2.1 (1.1)_____ _____ _____ _____ . 2.2 (2.2)_____ _____

3. What are the advantages of a hydraulic cam follower/lifter to the adjustable and non-adjustable followers? 4. Why does valve timing remain more accurate with the use of a hydraulic valve follower? Explain. 5. Explain the function of a cam follower.	_____ _____ . 2.3 (2.3)_____ _____ _____ _____ . 2.4 (2.4)_____ _____ _____ _____ . 3._____ _____ _____ _____ _____ . 4._____ _____ _____ _____ _____ _____ ____ . 5._____ _____ _____ _____ _____ ____ .

ACTIVITY 10

Grade 11	Term: 1	Week No:	**7**	Class	
Topic: Engines	**Valve timing diagram**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Do research on one specific vehicle and **draw a valve timing diagram** for that specific vehicle. *****Vehicle make and model must be mentioned. Attach specifications of vehicle.	**1. Valve timing diagram and specifications**

ACTIVITY 11

Grade 11	Term: 1	Week No:	**7**	Class	
Topic: Engines	• **Variable valve timing** • **Timing drive gear**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Explain the purpose of variable valve timing.	1._____ _____ _____ _____ _____ .
2. Do research on the various methods that can be used to achieve continuous variable valve timing. Discus at least **TWO** methods on how this can be achieved. .	2.Method 1: _____ _____ _____ _____ _____ _____ _____ . Method 2: _____ _____ _____ _____ _____ _____ _____ _____ _____ .
3. What is the advantage of timing chain drive over a belt drive?	3._____ _____

4. What are the disadvantages of timing chain drives?	_____ _____ _____ _____ _____ . 4._____ _____ _____ _____ _____ _____ _____ _____ _____ .

ACTIVITY 1

Grade 11	Term: 2	Week No:	1	Class	
Topic: Systems and Control	**Final drives**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
5. Describe the difference between a spiral bevel and a hypoid type final drive.	1.
6. Explain the functions of the differential?	2. _____
7. Why does a spiral bevel differential have such a quiet operation?	3._____
	4.

1.

Spiral Bevel Final Drive	**Hypoid Type Final Drive**
1.	1.
2.	2.
3.	3.
4.	4.

2. _____
_____
_____
_____
_____
_____ .

3._____
_____
_____
_____
_____
_____ .

4.

Limited Slip Differential	**Conventional Differential**

8. State FOUR advantages of the limited slip differential if compared to the conventional differential.

1.	1.
2.	2.
3.	3.
4.	4.

9. Witch parts are found in the limited slip differential that is not in the conventional differential.

5.1_____

5.2_____

5.3_____

5.4_____

ACTIVITY 2

Grade 11	Term: 2	Week No:	**2**	Class	
Topic: Systems and Control	**Drive systems**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Do research on a minimum of TEN vehicles and list: 1.1 The type of drive system of each. 1.2 TWO Advantages obtained from the particular drive system for each of the TEN vehicles	1. Name of vehicle: _____ 1.1 Type of drive system: _____ 1.2 TWO Advantages of drive system: 1.2.1_____ _____ _____ . 1.2.2_____ _____ _____ . 2. Name of vehicle: _____ 2.1 Type of drive system: _____ 2.2 TWO Advantages of drive system: 2.2.1_____ _____ _____ . 2.2.2_____ _____ _____ 3. Name of vehicle: _____ 3.1 Type of drive system: _____

	3.2 TWO Advantages of drive system: 3.2.1_____ _____ _____ . 3.2.2_____ _____ _____ 4. Name of vehicle: _____ 4.1 Type of drive system: _____ 4.2 TWO Advantages of drive system: 4.2.1_____ _____ _____ . 4.2.2_____ _____ _____ 5. Name of vehicle: _____ 5.1 Type of drive system: _____ 5.2 TWO Advantages of drive system: 5.2.1_____ _____ _____ . 5.2.2_____ _____ _____ 6. Name of vehicle: _____ 6.1 Type of drive system: _____ 6.2 TWO Advantages of drive system:

	6.2.1_____ _____ _____ . 6.2.2_____ _____ _____ 7. Name of vehicle: _____ 7.1 Type of drive system: _____ 7.2 TWO Advantages of drive system: 7.2.1_____ _____ _____ . 7.2.2_____ _____ _____ 8. Name of vehicle: _____ 8.1 Type of drive system: _____ 8.2 TWO Advantages of drive system: 8.2.1_____ _____ _____ . 8.2.2_____ _____ _____ 9. Name of vehicle: _____ 9.1 Type of drive system: _____ 9.2 TWO Advantages of drive system:

	9.2.1_____ _____ _____ . 9.2.2_____ _____ _____ 10. Name of vehicle: _____ 10.1 Type of drive system: _____ 10.2 TWO Advantages of drive system: 10.2.1_____ _____ _____ . 10.2.2_____ _____ _____

ACTIVITY 3

Grade 11	Term: 2	Week No:	**3**	Class	
Topic: Systems and Control	**Hydraulic Brakes** **Master Cylinder**				
Learner:	• Complete work sheet below				

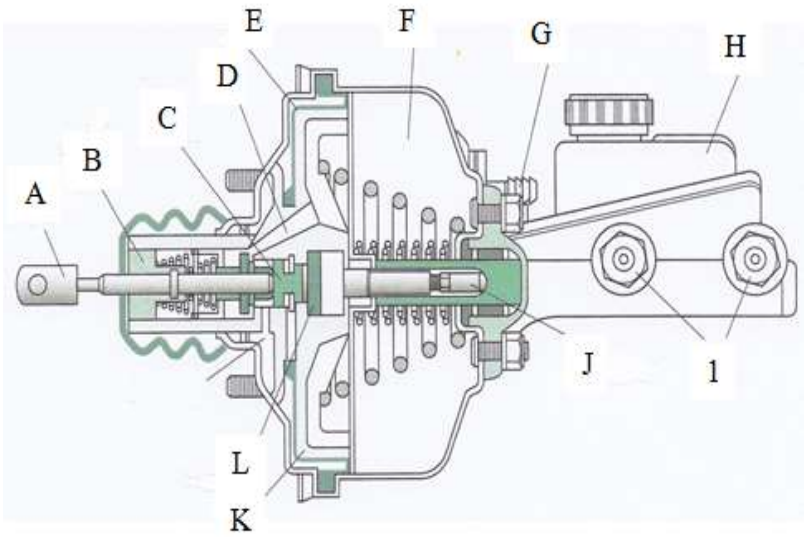
Instructions	**Answers/Record of work completed**
1. Dismantle a duel brake master cylinder. Investigate all components and write a condition report on the master cylinder and all components. When task is completed master cylinder must be assembled.	1. Learner to do condition report below on all components: Master Cylinder: Condition report: _____ _____ _____ _____ _____ . Component 1: _____ Condition report: _____ _____ _____ _____ _____ . Component 2: _____ _____ _____ _____ _____ _____ . Component 3: _____ _____ _____ _____

	_____ _____ . Component 4: _____ _____ _____ _____ _____ _____ . Component 5: _____ _____ _____ _____ _____ _____ . Component 6: _____ _____ _____ _____ _____ _____ . Component 7: _____ _____ _____ _____ _____ _____ . Component 8: _____ _____ _____ _____ _____ _____ . 2._____ _____
2. What is the purpose of the check valve in the master cylinder? **3.** Explain, in points form, the operation of a duel master cylinder when the brakes are applied.	

4. If you experience binding brakes what could be the possible reason/s?	_____ _____ _____ . 3._____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ . 4._____ _____ _____ _____ _____ .

ACTIVITY 4

Grade 11	Term: 2	Week No:	**4**	Class	
Topic: Systems and Control	**Hydraulic Brakes** **Brake Boosters**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Below is a sketch of the brake servo/booster. Label all the components.  **2.** Explain, in point form, the operation when in rest/released position.	1. A. _____ B. _____ C. _____ D. _____ E. _____ F. _____ G. _____ H. _____ I. _____ J. _____ K. _____ L. _____

3. How would you test if the brake servo is working?

2._____

3._____

ACTIVITY 5

Grade 11	Term: 2	Week No:	**4**	Class	
Topic: Systems and Control	**Hydraulic Brakes** **ABS brakes**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Explain why antilock braking systems (ABS) was developed for motor vehicles.	1._____ _____ _____ _____ _____ _____ .
2. All vehicles fitted with an ABS system have an ABS warning light (monitoring system) that comes on and switches off when there is no problem with the system once the vehicle has been started. Explain why there is a need for a monitoring system on vehicles.	2._____ _____ _____ _____ _____ _____ .
3. Although ABS braking systems consist of many components, there are THREE that all systems have as listed below. Explain the function of each of these components. 3.1 Wheel speed sensors:	3. Function of ABS components. 3.1_____ _____ _____ _____ _____ _____ _____ .

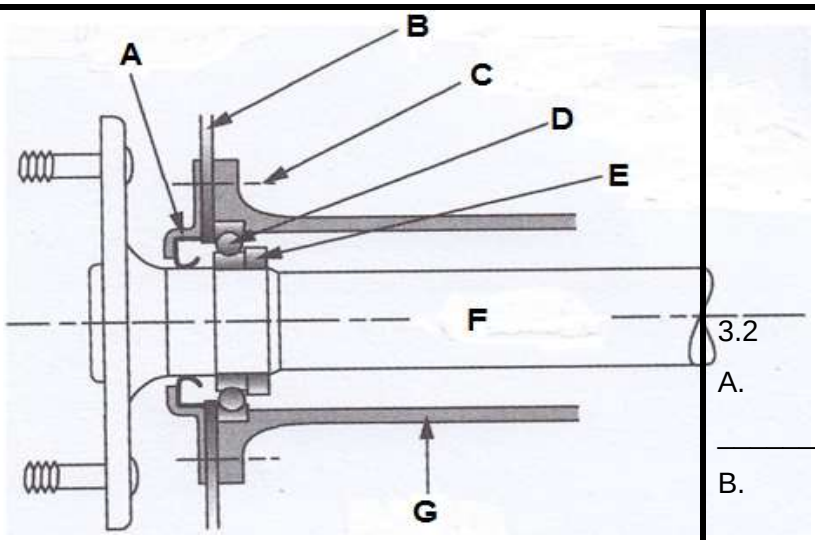
3.2 Electronic control unit:	3.2_____ _____ _____ _____ _____ _____ .
3.3 Hydraulic modulator:	3.3_____ _____ _____ _____ _____ _____ .
4. ABS operate mostly in THREE modes. Explain what happens during each of the operating modes below: 4.1 Isolation mode:	4. 4.1_____ _____ _____ _____ _____ _____ _____ _____ .
4.2 Dump mode:	4.2_____ _____ _____ _____ _____ _____ .
	4.3_____ _____ _____ _____

4.3 Reapply mode:	_____ _____ _____ .

ACTIVITY 6

Grade 11	Term: 2	Week No:	**5**	Class	
Topic: Systems and Control	**Front and rear axles**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Identify the type of axle below.  	1. Type of axle: _____
2. State one disadvantage of the type of front axle in point no 1.	2. Disadvantage: _____ _____ _____ _____ _____ _____ _____ ___ .
3. **3.1** Identify the type of rear axle below:	3.Type of rear axle: 3.1 _____



3.2 Label the components of the rear axle above.

4. State THREE advantages of a full floating rear axle.

3.2

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

4.

4.1 _____

_____

_____

_____

_____

_____ .

4.2 _____

_____

_____

_____

_____

_____ .

	4.3_____ _____ _____ _____

ACTIVITY 7

Grade 11	Term: 2	Week No:	**6-7**	Class	
Topic: Systems and Control	**Steering systems** **Manual steering boxes**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Identify the type of steering box below.  2. State ONE advantage and One disadvantage of this type of steering box. 3. Explain the function of the steering box.	1. Type of steering box: _____ _ 2. 2.1 Advantage: _____ _____ _____ _____ __ . 2.2 Disadvantage: _____ _____ _____ _____ _____ .

4. Explain what a reduction ratio is. 5. Name THREE types of steering boxes besides the rack and pinion type. 6. What is the function of the pitman arm? 7. What is the function of the spool control valve on the hydraulic power assisted steering?	3. Function of steering box. (gearbox): _____ _____ _____ _____ _____ _____ . 4._____ _____ _____ _____ _____ _____ . 5. 5.1_____ _ 5.2_____ _ 5.3_____ _ 6._____ _____ _____ _____ _____ . 7._____ _____ _____ _____ _____ _____ .

ACTIVITY 8

Grade 11	Term: 2	Week No:	**6-7**	Class	
Topic: Systems and Control	**Steering systems** **Hydraulic and electric power steering**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Name the TWO types of power steering systems generally in use. (Hydraulic) 2. Name the main components of a power steering? 3. Describe, in point form, the operation of the power steering when the wheels are turned.	1. Type of steering system: 1.1 _____ _ 1.2 _____ _ 2. _____ 3._____

	____ ______________ .
4. Do research on electric power steering and explain why so many manufacturers are taking this rout above the conventional hydraulic power steering.	4.____
5. Explain why must “steering characteristics” remain under all speeds?	________ . 5.
6. Name THREE advantages of electric power steering to the conventional hydraulic power	

steering under the following headings: 6.1 Safety 6.2 Comfort 6.3 Steering 7. Explain the function of the torque sensor. 8. What does it mean when manufacturers call electric power steering a modular design? 9. What is the average gear ratio for a steering gearbox? 10. When diagnosing a fault on the EPS there is normally a SIX stage process. Draw a line diagram to show the SIX stages.	_____ _____ _____ _____ _____ . 6. 6.1_____ _____ _____ __ . 6.2_____ _____ _____ ___ . 6.3_____ _____ _____ _____ . 7._____ _____ _____ _____ _____ . 8._____ _____ _____ _____ _____ . 9._____ ____.

11. What is the function of the spool control valve on the hydraulic power assisted steering?	10. 11._____ _____ _____ _____ _____ _____ .

ACTIVITY 9

Grade 11	Term: 2	Week No:	**7**	Class	
Topic: Systems and Control	**Steering systems** **Steering control components**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Explain the purpose of the drag link. 2. Would a rack and pinion type steering make use of a drag link? 3. Explain the function of tie rod assemblies. 4. Explain the function of ball joints/ball sockets. 5. When a component has been replaced on the suspension, what would need to be checked? 6. What is a quick method to determine if a ball joint or tie rod end is worn?	1._____ _____ _____ _____ _____ . 2._____ _____ _____ _____ _____ . 3._____ _____ _____ _____ _____ . 4._____ _____ _____ _____ _____ . 5._____ _____ _____

	_____ _____ . 6._____ _____ _____ _____ _____ _____

ACTIVITY 1

Grade 11	Term: 3	Week No:	1	Class	
Topic: Systems and Control	**Suspension layout and operation:**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
10. Define sprung mass. 11. Define unsprung mass. 12. State methods to reduce unsprung mass.	1. _____ _____ _____ _____ _____ . **2.** _____ _____ _____ _____ _____ **.** **3.** _____ _____ _____ _____ _____ _____ **.**

ACTIVITY 2

Grade 11	Term: 3	Week No:	1	Class	
Topic: Systems and Control	**Suspension lay outs**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. State THREE advantages of leaf springs.	**1.**_____
2. State THREE disadvantages of leaf springs.	_____ **.** **2.**_____
3. Which type of vehicles would normally make use of leaf springs?	_____ **.** **3.**_____
4. Why are anti-sway bars needed for coil spring suspension?	_____ **.** **4.**_____
5. What does the term suspension travel refer to?	**.** **5.**_____
6. State FIVE advantages of torsion bar suspension.	_____ **.** **6.**_____

7. Draw a neat labeled sketch to show a transverse torsion bar suspension.	_____ _____ _____ _____ . **7.**

ACTIVITY 3

Grade 11	**Term: 3**	**Week No:**	**1**	**Class**	
Topic: Systems and Control	**Control** **Shock absorbers**				
Learner:	• **Complete work sheet below**				

Instructions	**Answers/Record of work completed**
1. **Explain the function of the shock absorber.**	**1.**_____ _____ _____ _____ _____ _____ .
2. **Explain the compression stroke.**	**2.**_____ _____ _____ _____ _____ _____ _____ .
3. **Explain the rebound stroke**	**3.**_____ _____ _____
4. **What is the difference between a hydraulic and gas filled shock absorber?**	

5. **What are the dangers of worn shock absorbers?**

6. **Explain the difference between an anti-sway bar and a stabilizer bar.**

_____

_____ .

13. **Hydraulic Shock absorber:**_____

_____

_____

_____

_____ .

Gas filled Shock absorber:_____

_____

_____

_____

_____ .

14. _____

_____

_____

_ .

15. **Anti-sway bar:**_____

_____

_____

_____

_____ .

Stabiliser bar:_____

_____

_____

_____

_____ .

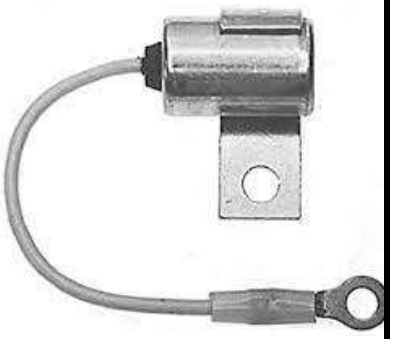
ACTIVITY 4

Grade 11	Term: 3	Week No:	**2**	Class	
Topic: Systems and Control	**Conventional Ignition system (Contact points system)**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Examine the following components of the conventional ignition system and answer the questions that follow. • **Ignition switch**:  • **Ignition coil:**	1. Function of components: • _____ _____ _____ _____ _____ . • _____ _____ _____ _____ _____ . • **Distributor components**

- **Distributor components**:
  - **Contact points:**

  - **Condenser:**



  - _____
    _____
    _____
    _____
    _____ .

  - _____
    _____
    _____
    _____
    _____ .

  - _____
    _____
    _____
    _____
    _____ .

- **Distributer shaft**:

- _____
  _____
  _____
  _____
  _____
  _ .

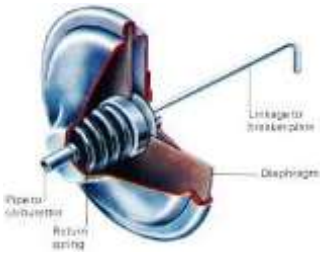
- **Distributor cap**:

- _____
  _____
  _____
  _____
  _____
  _ .

- **Mechanical advance:**

- _____
  _____
  _____
  _____

- **Vacuum advance:**



- **HT leads:**

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- **Sparkplug:**

2. The ignition coil is one of the components capable of increasing the 12 volts input from the battery to about 25000 volts to be delivered across the air gap at the spark plug. Explain how this increase in voltage is possible.

3. Why is a spark plug heat range important?

4. What does ignition timing refer to on a four-stroke petrol engine?

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ACTIVITY 5

Grade 11	Term: 3	Week No:	3	Class	
Topic: Systems and Control	**Starting circuit**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Vehicle manufacturers opt more and more for keyless ignition. Do some research on this and explain the advantages of the keyless system? 2. Use a simple sketch to explain the operation of the starter motor.	1._____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ __ . **2.**

3. What is a stop-start system? 4. Why is the stop-start system being used?	**3.**_____ _____ _____ _____ _____ **.** **4.**_____ _____ _____ **.**

ACTIVITY 6

Grade 11	Term: 3	Week No:	3	Class	
Topic: Systems and Control	• Supplementary Systems • Traction control				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
Do research on traction control used on the modern motor vehicle and answer the questions that follow.	
1. Explain the function of traction control.	**1.**_____ _____ _____ _____ _____ .
2. Various methods can be used to control traction of the motor vehicle. Discuss this under the following headings:	**2.**
2.1 **Throttle control**	**2.1**_____ _____ _____ _____ _____ _____ .
2.2 Ignition control	**2.2**_____ _____ _____ _____ _____ _____ .

2.3 Braking effect	**2.3**_____ _____ _____ _____ _____ _____ **.**

ACTIVITY 7

Grade 11	Term: 3	Week No:	3	Class	
Topic: Systems and Control	• Supplementary Systems • Air bags				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Air bags are classified as passive systems. Explain the difference between an active and passive system.	**1. Active:**_____ _____ _____ _____ _____ _____ _____ . **Passive:**_____ _____ _____ _____ _____ _____ _____ .
2. Why is it important that an air bag system is monitored in a vehicle?	**2.**_____ _____ _____ _____ _____ .
3. Name any FIVE components of a basic air bag system.	**3.1**_____ _ **3.2**_____ ___ **3.3**_____ ___

4. Give a brief description of an air bag construction. 5. Why are seat switches used for the passenger seats of a motor vehicle? 6. Name TWO types of crash switches that can be used.	**3.4**_____ ___ **3.5**_____ ___ **4.**_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ **.** **5.**_____ _____ _____ _____ _____ **.** **6.1.**_____ _ **.** **6.2**_____ _ **.**

ACTIVITY 8

Grade 11	Term: 3	Week No:	4	Class	
Topic: Maintenance	**Engine lubrication** **Oil Pumps**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Identify the oil pump below: 	**1.** _____ **.**
2. Investigate this type of pump and determine if there is any wear. Write a little report on the findings.	**2.**_____ _____ _____ _____ _____ _____ _____ _____ **.**
3. Identify the type of oil pump below:	**3.** _____ **.**
	4._____ _____

4. Describe the operation of this type of oil pump.

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ACTIVITY 9

Grade 11	Term: 3	Week No:	4	Class	
Topic: Maintenance	**Engine lubrication** **Oil filter systems** **Oil control methods**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Describe the difference between a full-flow system and a by-pass system.	• **Full –flow system:**_____ _____ _____ _____ _____ **.** • **By-pass system:**_____ _____ _____ _____
2. Investigate where the following components are found on the engines in your workshop. 2.1 Oil pump 2.2 Oil pressure relief valve	2. Learner record findings below: 2.1_____ _____ . 2.2_____ _____
3. Explain the function of the oil pressure relief valve.	**3.**_____ _____ _____ _____ _____ _____

ACTIVITY 10

Grade 11	Term: 3	Week No:	5	Class	
Topic: Maintenance	**Vehicle servicing**				
Teacher:	• Learner to complete the work sheet • Research material must be available for learners				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Vehicles must be regularly serviced to perform to its optimum. Learners to choose any TWO makes of vehicle and do research on the routine work that the agents will carry out on during a major service.	**1. Learners will record their research below:** **Vehicle 1:** _____ _____ _____ _____ _____ _____ _____**Vehicle 2:** _____ _____ _____ _____ _____ _____ _____ _____

ACTIVITY 11

Grade 11	Term: 3	Week No:	6 - 7	Class	
Topic: Forces	**Work, Power and Torque**				
Teacher:	• Learner to complete the work sheet • Engine components and research material				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Define the following terms: 1.1 Work 1.2 Power 1.3 Torque	**1.** 1.1. Work: _____ _____ _____ ___ . 1.2. Power:_____ _____ _____ . 1.3. Torque: _____ _____ _____ __ .

ACTIVITY 12

Grade 11	Term: 3	Week No:	7	Class	
Topic: Forces	**Compression ratio**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
1. Define the following terms: 1.1 Compression ratio 1.2 Swept volume 1.3 Clearance volume or combustion chamber volume **2.** Do measurements of **Stroke length** and **Cylinder bore** in an engine in the workshop and calculate the compression ratio after calculating the Swept Volume. You can use water in a pipette to measure the Clearance Volume.	**1.** **1.1**_____ _____ _____ _____ _____ **.** 1.2_____ _____ _____ _____ _____ . **1.3**_____ _____ _____ _____ _____ **.** **2.**_____ _____ _____ _____ _____ _____ _____ _____ _____

Activity 13

Grade 11	Term: 4	Week No:	1-2	Class	
Topic: Terminology	**Workshop Administration**				
Learner:	• Complete work sheet below				

Instructions	**Answers/Record of work completed**
16. Draw a workshop layout for a general garage	**1.**