



MECHANICAL TECHNOLOGY

AUTOMOTIVE

GRADE 10

PRACTICAL ASSESSMENT TASKS

2024

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SECTION A: EDUCATOR GUIDELINES FOR PAT GRADE 10

1. INTRODUCTION / BACKGROUND

The 18 Curriculum and Assessment Policy Statements subjects which contain a practical component all include a practical assessment task (PAT). These subjects are:

AGRICULTURE: Agricultural Management Practices, Agricultural Technology
ARTS: Dance Studies, Design, Dramatic Arts, Music, Visual Arts
SCIENCES: Computer Applications Technology, Information Technology,
Technical Sciences.
SERVICES: Consumer Studies, Hospitality Studies, Tourism
TECHNOLOGY: **MECHANICAL TECHNOLOGY**, Civil Technology, Electrical
Technology, and Engineering Graphics and Design.
MATHEMATICS: Technical Mathematics.

A practical assessment task (PAT) mark is a compulsory component of the final promotion mark for all candidates offering subjects that have a practical component and counts 25% (100 marks) of the end-of-year examination mark. The PAT is implemented across the first three terms of the school year. This is broken down into different phases or a series of smaller activities that make up the PAT. The PAT allows for candidate to be assessed on a regular basis during the school year and it also allows for the assessment of skills that cannot be assessed in a written format, e.g., test or examination. It is therefore important that schools ensure that all candidates complete the practical assessment tasks within the stipulated period to ensure that candidate are resulted at the end of the school year. The planning and execution of the PAT differs from subject to subject.

The PAT allows the teacher to directly and systematically observe applied competence. The PAT comprises the application/performance of the knowledge, skills and values particular to that subject and counts 25% of the total promotion/certification mark out of 400 for the subject.

The PAT is implemented across the first three terms of the school year.

Any profession requires of its members a thorough grounding in both theory and practice and mechanical technology is no exception. It is emphasized that the goal of the practical assessment task is to produce a skilled candidate in each specialisation field. A nation's true wealth is in its manpower and education that should aim to develop the talents of a candidate so that he/she can contribute to the well-being of the society by using and developing scientific and technological resources.

To prepare a candidate in mechanical technology specialisation fields, one must focus on the following:

- An attitude where the candidate can selectively use ideas, gather evidence and facts, to drawing logical conclusions to put them to good use creatively and with imagination;

- A capability to express ideas and information clearly by speech, writing, drawing and manufacturing and

- A willingness and capability to accept and exercise responsibility, to make decisions, and to learn by experience.

Attributes such as these cannot all be achieved in a classroom. A sound knowledge of engineering sciences is essential to equip the mechanical technology candidate with the

necessary practical capabilities for the required processes. Practical training is the application of acquiring essential skills to bridge the gap between trade theory and practice.

Practical application in the workshop must therefore be made an interesting and challenging experience to develop the candidate's both physically and mentally. The candidates must show his/her initiative, curiosity and persistence in learning. In order to stimulate and develop self-confidence the granting of some degree of responsibility during the practical application is very important.

2. TEACHER GUIDELINES

2.1 Administration of the PAT

Teachers are requested to make copies of the different specialisation PAT documents. These documents need to be handed out to the candidates at the beginning of the year. The Practical Assessment Task for Grade 12 is externally set, internally assessed and externally moderated.

Teachers must attach due dates for the different facets of the PAT (refer to the CAPS document). In this manner, candidates can easily assess their progress. Instances where formal assessments take place, it is the responsibility of the teacher to administer assessment.

The PAT should be completed within the first three terms. The PAT should be completed under controlled conditions (refer to Mechanical Technology SPECIALISATION: CAPS Grade 10 –12).

Educators **MUST** build a prototype of the task in order to be able to demonstrate to the candidates how the final product will look like. It will guide the candidates with visual presentation. It provides the educator with insight into possible challenges regarding machines, equipment or material and what possible manufacturing procedures he/she need to follow in the workshop in order to complete the PAT.

2.2 Assessment of PAT

Frequent and developmental feedback is needed to ensure necessary guidance and support to the candidates.

Both formal and informal assessment should be conducted to ensure that the embedded skills are developed. Informal assessment can be conducted only to monitor progress of the candidates. Formal assessment should always be conducted and recorded by the candidates.

On completion of each phase in each term, the marks for the completed phase need to be recorded onto the school administration system.

2.3 Moderation of PAT

The tasks, projects, assessment criteria as well as the mark sheets must be presented to the moderator during moderation of the PAT.

The moderator should be able to call on a candidate to explain and demonstrate the functions, principles and skills during the moderation purposes.

On completion the moderator will, if necessary, adjust the marks of the group upwards or downwards depending on the decision reached as a result of moderation.

Task must be clearly marked with the correct initials and surname of each candidate.

2.4 Consequences of absence / non-submission of tasks.

If a candidate's practical assessment task is incomplete or unavailable with valid reason, the candidate may be given three weeks before the commencement of the final end-of-year examination to submit the outstanding task. Should the candidate fail to fulfil the outstanding PAT requirement, such a candidate will be awarded a zero mark for that PAT component.

A candidate's results are regarded as incomplete if he/she does not offer any component of the PAT task. He / She will be given another opportunity based on the decision of the head of the assessment body. Should the candidate fail to fulfil the outstanding PAT requirement, the marks for these components will be omitted and the final mark for Mechanical Technology will be adjusted for promotion purposes in terms of the completed tasks. If any tasks are still outstanding, the candidate runs the risk of not being resulted at the end of the year.

3. ADMINISTRATION OF THE PAT

The PAT (all phases) should be **completed in the first three terms**. The PAT must be completed under controlled conditions.

Educators must attach their own due dates for the different phases of the PAT (Refer: Mechanical Technology CAPS Gr10 – 12 Document).

In this manner, Learners can easily assess their progress. Instances where formal assessments take place, it is the responsibility of the Educator to administer the assessment.

Educators are requested to make copies of **Section B** and distribute to Learners at the beginning of the year. Learners should receive the assessment criteria of the PAT at the beginning of the year when the PAT is handed out and this must be mediated with the Learners.

STRUCTURE OF THE PAT

PROCESS OF THE PAT		TOPIC	MARKS
TERM 1	Phase 1 Task	Terminology / <i>Manufacturing</i>	50
TERM 2	Phase 2 Task	Terminology / <i>Engine specific</i>	50
TERM 3	Phase 3 Task	Terminology / <i>Maintenance</i>	50
	<i>Phase 4 Task</i>	Terminology / <i>Engine specific / Maintenance</i>	100
		TOTAL MARKS	250 Convert to 100

Educators must attend to the following in their preparation:

The planning process;
 The knowledge and skills to be achieved;
 The safety and environmental aspects to be considered;
 The applicable calculations, sketches and/ or diagrams;
 The starting time and ending time – how long it took to complete from start to finish;
 Bill of materials;
 List of tools needed; and
 Any other information that is relevant to the project.

4. Assessment and moderation of the Practical Assessment Task

To ensure national standardization the PAT's for Grade 12 are externally set and moderated, but internally assessed. The PAT's for Grade 10 and 11 have to follow a similar standardization process but this is done provincially and thus are set by allocated people and moderated by the Subject Advisers for Mechanical Technology.

4.1 Assessment

Frequent developmental feedback by the Educator is needed to guide and give support to the Learner to ensure that the Learner is progressing as envisaged.

Both *formal and informal assessment* should be conducted on the different phases that constitute the PAT. Informal assessment can be conducted by the Learners themselves, by a peer group of Learners, or by the Educator. Formal assessment should always be conducted by the Educator and must be recorded on the working mark sheets distributed by the Subject Advisers, these also constitute the final mark sheet for the subject and must always be available in printed format in the Educators File. These mark sheets must be updated and printed after each formal assessment. Note that the School and District structures may require results to be transferred to other documents/ systems like SASAMS, in this instance ALL results must correspond on all systems. Any differences must be brought to the attention of the Subject Advisor so that the error can be rectified.

4.2 Moderation

During moderation of the PAT, the project/ skills tasks will be presented to the moderator with the assessment criteria and marks obtained on the **facets mark sheet** and the **combined Excel working** mark sheet.

Where required, the moderator should be able to call on the Learner to explain the function, principles of operation and also request the Learner to exhibit the skills acquired through the capability tasks for moderation purposes.

4.3 Time planning:

- Phase 1: Complete at the end of first term – **March**.
- Phase 2: Complete at the end of second term – **June**.
- Phase 3: Complete during third term - End of **September**.
- Phase 4: Plan and start task during the first term and complete at the end of **September**.

MARKING RUBRICS FOR AUTOMOTIVE

DRILLING AND TAPPING

NOTE:

Use the Rubric A below for assessment for all holes to be drilled.

RUBRIC A - DRILLING OF HOLES	
Assessment facet	Mark
Drilling of correct diameter of hole	1
Depth correctly drilled	1
Hole clean and without burrs	1
Hole perpendicular to workpiece	1
Hole drilled to correct position on workpiece	1
Sub-total:	5

NOTE:

Use the Rubric B below for assessment for all internal and external screw threads to be tapped.

RUBRIC B – TAPPING OF SCREW THREADS	
Assessment facet	Mark
Cut correct screw thread	1
Screw thread perpendicular to workpiece	1
Screw thread has no burrs on outside	1
Depth/length to be tapped correctly	1
No defects (e.g., Cross thread)	1
Sub-total:	5

TOLERANCE RANGES**LENGTH AND DIAMETERS****NOTE:**

On all the lengths and diameters candidates will lose 1 mark for every 0,1 mm deviation from the basic size. Use rubric C for assessment on all lengths and diameters.

RUBRIC C - LENGTHS AND DIAMETERS	
DEVIATION	MARK DEDUCTIONS
0–0,1	-0
0,1–0,2	-1
0,2–0,3	-2
0,3–0,4	-3
0,4–0,5	-4
0,5 and more	-5

Safety (5)

- 1) Less 1 mark: Repetitive disregard for the use of PPE while working in the workshop.
- 2) Less 1 mark: Another negative mark for continuing to have a disregard for the use of PPE while working in the workshop.
- 3) Less 1 mark: Quality versus Time – “rush” job vs inefficient time to complete a good job
- 4) Less 1 mark: Not cleaning machine after work session.
- 5) Less 5 marks: Dangerous and fooling around in workshop, machines and equipment.

Finishing (5)

- 6) Less 1 mark for vice (jaw) damage - clamping marks for overtightening or loose slip.
- 7) Less 1 mark for lack of overall manufacturing competency in finishing / “look” of completed task related to surface finish and edges.
- 8) Less 1 mark for lack of overall manufacturing competency in square-ness of project.
- 9) Less 1 mark for lack of overall manufacturing competency in centrality, etc.

ABSENCE / NON-SUBMISSION OF TASKS

If a learner's practical assessment task is incomplete or unavailable for a valid reason, the learner will be given three weeks before the commencement of the final end-of-year examinations to submit the outstanding task. Should a learner fail to fulfil the outstanding PAT requirement such a learner will be awarded a zero (0) for that PAT component.

A learner's results are regarded as incomplete if he/she does not offer any component of the PAT task. He/she will be given another opportunity based on the decision of the Head of the Assessment Body.

Should the learner fail to fulfil the outstanding PAT requirement, the marks for these components will be omitted and the final mark for Mechanical Technology will be adjusted for promotion purposes in terms of the completed tasks.

SECTION B: THE PRACTICAL ASSESSMENT TASK GRADE 10**AUTOMOTIVE**

The Practical Assessment Task (PAT) consists of FOUR Phases, one per term over term 1 to 3, with the **Phase 4 Task** that can be started in the **First Term** and **completed in the Third Term** – Thus spanning all three terms. Term 4 is reserved for the final theoretical content and revision.

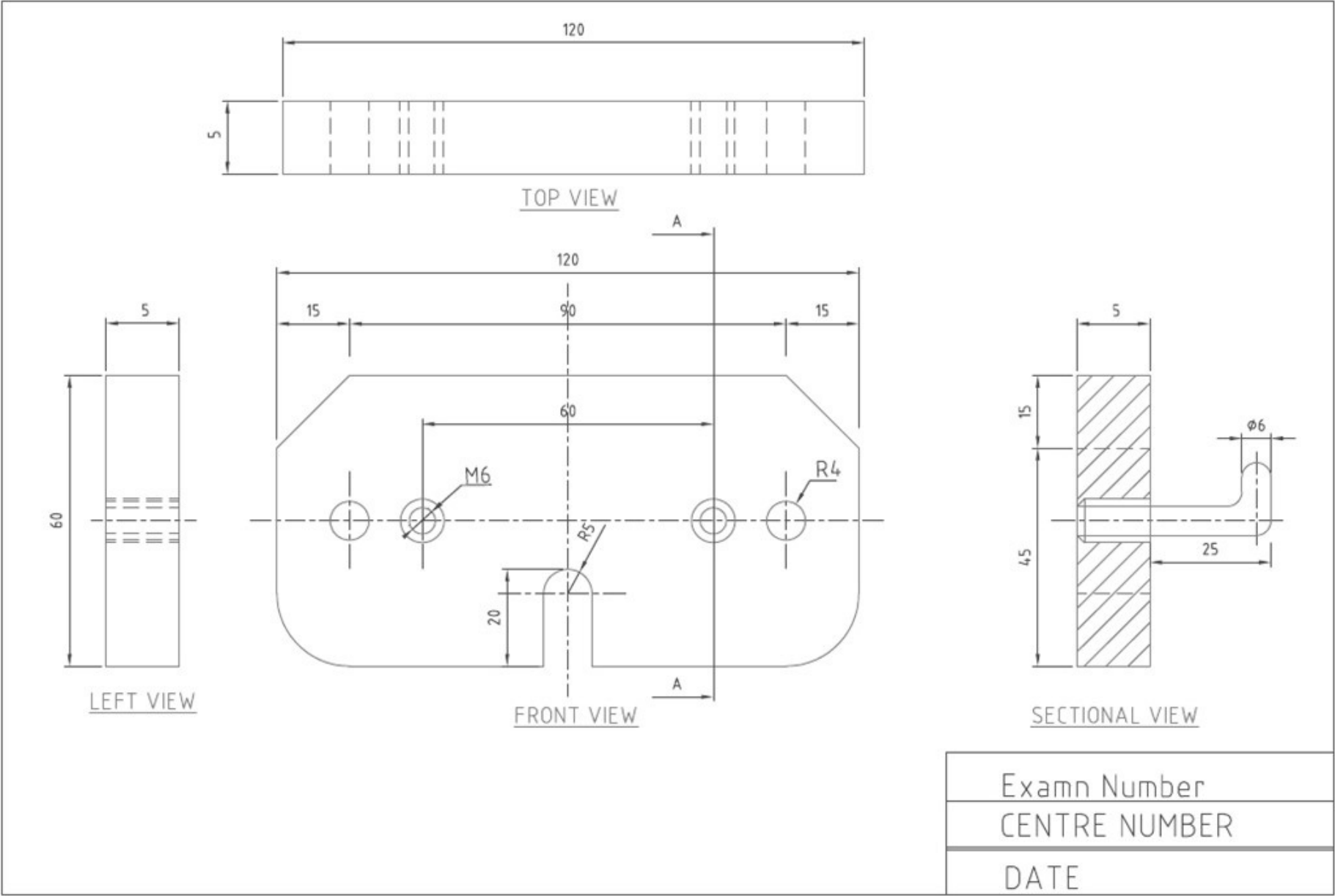
PHASE ONE: TASK: Basic Hand skills**Resources Required:**

- Mild steel flat bar 120 x 60x 5mm (the school may opt to use between 5-6mm) (if flat plate is used, ensure that two sides are parallel to each other).
- Appropriate metal hand files.
- Vernier and other measuring equipment (callipers, steel rule etc).
- Marking medium (Engineers blue, Koki pen, chalk etc.)
- Marking off instruments (Square, combination square, scribe etc.)
- Centre punch.
- Hammer- ball pene /cross pene
- Hacksaw.
- Files, smooth- bastard flat- square- triangle- round and half round
- Stocks and dies
- *Appropriately sized* Twist Drill bits to enable M6
- Cut the radii with a hacksaw and then smoothen with hand file
- Press drilling machine.

Instructions:

- 1) Apply marking blue or any other medium onto the workpiece and mark out the dimensions according to the drawing
- 2) Use a steel rule to check / ensure that the material can be cut / filed to 120mm in length i.e., if pre-cut pieces are used the starting length should be about 120mm.
- 3) Use engineers square on either of the 120mm ends of the material to plan a square line.
- 4) Use a scribe to scribe this straight square line about 5mm from the rough edge.
- 5) Use the square and scribe on the opposite end of the material to scribe a straight, square line so that the material between the lines is 120mm in length (ensure lines are parallel).
- 6) ***Request an informal assessment on the marked lines before proceeding.***
- 7) Cut with a hacksaw about 1-2mm on the waste side of the above lines (Do NOT cut on the line).
- 8) ***Request a formal assessment on your ability to cut straight before proceeding.***
- 9) First use a rough-cut bastard file to file both ends, use the engineers square regularly to check for squareness.
- 10) ***Request a formal assessment on your ability to file all sides square and to size, before proceeding.***
- 11) Then using a smooth double cut file, complete the filing process.

- 12) Request formal assessment on ability to file square to tolerance.**
- 13) Use the centre punch to mark the holes for drilling.
- 14) Request informal assessment on your ability to mark and punch this centre point, before proceeding (5).**
- 15) Measure and mark a point 15mm from each end on the 120mm length.
- 16) Scribe a line across the width of the material at the 15mm marks, parallel to the middle line scribed earlier.
- 17) Along one 15mm line, measure and mark from both sides 15mm inwards and centre punch these TWO marks in preparation for drilling.
- 18) Use this punch mark to scribe the two 15mm radii on the two corners
- 19) Along the other 15mm line, measure and mark from each side 15mm inwards and centre punch these TWO marks in preparation for drilling.
- 20) Cut 1-2mm away from the line using a hacksaw, then use a smooth finish to complete a neat curve.
- 21) Request formal assessment on your ability to mark and punch these centre points accurately and the grinding of the radii, before proceeding.**
- 22) Use a press drill machine to drill two 4mm holes. (Ensure the hole is perpendicular, using large engineers square if hand drill is used!)
- 23) Request an informal assessment / guidance on attempt and required skill to drill the other holes perpendicular to the surface, before proceeding.**
- 24) Use a press drill machine to drill two holes on the centre punched holes positioned on the on the plate, suitable to cut a M6 thread. (Ensure holes are perpendicular, use large engineers square if hand drill is used!)
- 25) Hand task in for formal assessment on your ability to drill perpendicular holes.**
- 26) Use the taps in the correct order to 2 x M6 thread. (Taper, tap, second tap and plug tap)
- 27) Cut a 40mmx Ø6 mm round bar for the key hook.
- 28) Taper one end to ensure an easy start for cutting the external M6 thread.
- 29) Secure the rod in the vice and cut the threads for a length of 5mm.
- 30) Secure the rod in the bench vice to form a hook (approximately 8-10mm) The hook can be at 90° or greater than as an option.
- 31) Screw the hook onto the backing plate.
- 32) Hand the task in for formal assessment on your ability to cut square / perpendicular thread in different sized holes.
- 33) Clean any burs, roughness and dirt caused by the drilling, cutting and manufacturing process.
- 34) Hand the task in for **formal final assessment** on your **ability to clean your project.**



MARKING RUBRIC

GRADE: 10		YEAR: 2024		SCHOOL:									
DATE STARTED:				DATE COMPLETED:									
SUBJECT: Mechanical Technology – Automotive				EDUCATOR:									
PROJECT: TERM ONE - PHASE ONE				NUMBER OF LEARNERS:									
PAGE ____ of ____				Tools: Hand skills Task									
ASSESSMENT		FACETS	Measuring and marking	cutting with the hacksaw	Squareness of ALL sides	Filing of angles	Cutting the recess.	Filing the radii	Drilling of 4 x 10mm holes.	Thread cutting x 2(M6)	Finishing	SUB-TOTAL	
			10	10	5	10	10	10	20	20	5	100	50
1	Learner – Self-Assessment												
	Date of self-assessment:												
2	Teacher Assessment												
	Comment:												
3	Internal Moderation												
	Comment:												
4	Provincial Moderation												
	Comment:												
5	External Moderation												
	Comment:												
General Feedback:													
SIGNATURE EDUCATOR													
SIGNATURE HEAD OF DEPARTMENT													
SIGNATURE SUBJECT ADVISOR													
SIGNATURE PRINCIPAL													

TERM TWO: PHASE TWO**Grade 10 Automotive****ENGINES (SPECIFIC): Identification and installation Task****Procedure:**

The outcome of this task is to assess the learner's skills and ability to understand the relationship between the different hand tools in the workshop and how to convert this knowledge into useful skills by dismantling an internal combustion engine, identifying the parts and assembling the engine or parts thereof, back to original condition / status. The understanding of Engineering Graphic and Design will relate to this task as the learner must be able to refer to, two dimensional drawings of components and relate this to the identification process in the workshop.

**READ ALL THE INSTRUCTIONS FIRST THEN PROCEED
FOLLOW ASSESSMENT INSTRUCTIONS AS INDICATED**

Resources Required:

- FOUR and TWO stroke Internal Combustion Engines and / or parts that can be assembled as units.
- Parts may be separate items but such that Learners can experience the complete unit.
- Appropriate tools and equipment to dismantle and assemble specified parts.
- Appropriate Personal Protection Equipment (PPE).

Instructions for Phase Two task

Teacher to do a practical lesson whereby engine components are shown and discussed with learners. Explain the following by using actual components of engines:

- a. Name of component.
- b. Material used to manufacture component. Reasons/advantages for specific material to be used.
- c. Explain the function of each component.
- d. Engine block and cylinder head must be explained thoroughly with all components removed.
- e. On engine block give specific attention to water jackets and oil channels. Explain reasons for different size water jackets between front and rear cylinders.

- f. Identify main oil channel and all other oil channels running in engine block to various components for lubrication. It is important that this is discussed properly with learners as you will refer back to it when discussing the maintenance chapter.

After you have discussed above with the learners give them a chance to experience / investigate on their own. Learners must know the TWO and FOUR stroke internal combustion engines.

Ensure you know the functions / use of the different parts in Internal Combustion Engines.

Experience / investigate these parts practically and individually.

After the investigation and practice you should know all the components of the 2 and 4 stroke internal combustion engines and be able to explain how the different parts are fitted to the various engines.

Each learner must know the function of each component and the material it is made of.

Learners must be able to point out components cast into the engine block and cylinder head for example: water jackets, oil channels, oil return to sump, placement of oil pump and water pump etc.

After learners have been given a chance to investigate and experience on their own a practical exam must be set up by the teacher where each learner is given the chance to identify a certain number of components.

Teacher to ask for 1 or 2 days during a test or exam cycle to be included into the time table where learners will come to you individually and being tested on actual engine components.

Each component must only be marked with a number and learner must answer on a worksheet prepared by the teacher. Take note this is a PAT task and must be treated as a practical examination. Proof must be kept for moderation.

Marks awarded to learners identifying components on pictures or theoretically will not be accepted. Only where a learner has identified actual components from an engine that you have numbered exactly as on the work sheet will be accepted. Learners only receive and complete the work sheet on the day of the practical exam.

Each teacher to test learners during exam time under exam conditions.

NB! Worksheets MUST be available in learner's portfolio and marks captured on Composite mark sheet.

WORKSHEET 2.1

LEARNER NAME:

PRACTICAL APPLICATION – ENGINE PARTS

Action		Marks	
Disassembling engine	Remove cylinder head bolts and cylinder head	4	
	Remove fuel tank	2	
	Remove flywheel casing	2	
	Remove flywheel	4	
	Drain oil	2	
	Remove head gasket	2	
	Remove camshaft and valve lifters	4	
Sub-total:		[20]	

Action		Marks	
Creating new gasket	Cut out with ballpoint pen hammer gasket shape	2	
	Cut out inside	2	
	Punching holes	4	
	Fitting of gasket	2	
Sub-total:		[10]	

Action		Marks	
Assembling engine	Replace camshaft and valve lifters	4	
	Match timing marks	2	
	Replace gasket	2	
	Replace cylinder head bolts and cylinder head	4	
	Torque cylinder head bolts	4	
	Replace crankcase	2	
	Replace flywheel	4	
	Replace flywheel casing	2	
	Replace fuel tank	2	
	Insert new oil	2	
	Start engine	2	
Sub-total:		[30]	

WORKSHEET 2.2

LEARNER NAME:		
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CONDITION REPORT – ENGINE PARTS			
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Parts	Part Condition Report	Marks	
Cylinder head		2	
Flywheel		2	
Head gasket		2	
Camshaft		2	
Valves		2	
Sub-total:		[10]	

PHASE 2 MARK SHEET – ENGINE PARTS		
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Work sheet 1 – Disassembling engine	20	
Work sheet 1 – Creating new gasket	10	
Work sheet 1 – Assembling engine	30	
Work sheet 2 – Part Condition Report	10	
Sub-Total:	70	
Total:	50	

TERM THREE: PHASE THREE**Grade 10 Automotive****MAINTENANCE (SPECIFIC): Vehicle Service Task****Procedure:**

The outcome of this task is to assess the learner's skills and ability to understand the relationship between the vehicle and the maintenance thereof. This task aims at a general maintenance of a petrol vehicle and replacing of service parts. In order to save money, learners can remove parts, and then replace as if they were new parts. This PAT aims on the skills to conduct a general maintenance on vehicle.

Resources Required:

- FOUR stroke Internal Combustion engine on a stand in working condition or a motor vehicle if available.
- Service parts may be separate items but such that Learners can experience the complete unit.
- Appropriate tools and equipment to dismantle and assemble specified service parts.
- Appropriate Personal Protection Equipment (PPE).

Instructions for Phase Three task

A vehicle must be serviced and the following parts need to be removed, assessed (condition report on parts) and be replaced.

Oil change

Air filter change

Spark plugs changed

Oil filter change

Sump plug replacement

Fan belt replacement (belt that drives alternator / water pump).

Worksheet 3.1 must be completed by educator on observation of service.

Learners to complete a condition report on parts removed.

Engine needs to start after service.

WORKSHEET 3.1

LEARNER NAME:

PRACTICAL APPLICATION – ENGINE SERVICE

Action		Marks	
Remove service parts	Prepare engine for service – make vehicle safe and place oil drain pan under sump.	4	
	Remove high tension leads from plugs.	4	
	Open air cleaner and remove air filter.	2	
	Clean around spark plugs.	4	
	Remove spark plugs.	4	
	Remove dip stick and oil filler cap.	2	
	Remove oil sump plug.	2	
	Drain oil.	2	
	Remove oil filter.	2	
	Release tension on V-belt driving alternator / water pump	2	
	Remove V-belt driving alternator / water pump	2	
	Safe and correct use of tools	5	
	Sub-total:	[35]	

Action		Marks	
Replace service parts	Replace oil sump plug.	2	
	Replace oil filter correctly.	2	
	Replace plugs.	4	
	Replace high tension leads to plugs.	4	
	Replace air filter.	2	
	Close air cleaner cover.	2	
	Replace V-belt driving alternator / water pump.	2	
	Correct the tension on the V-belt.	2	
	Insert new oil.	2	
	Replace oil dip stick and filler cap	4	
	Check oil if correct.	2	
	Start engine.	2	
	Safe and correct use of tools.	5	
	Sub-total:	[35]	

WORKSHEET 3.2

LEARNER NAME:		
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CONDITION REPORT – ENGINE SERVICE			
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Parts	Part Condition Report	Marks	
Air filter		3	
Spark plugs		4	
V-belt		3	
Sump plug		2	
Oil filter		3	
Sub-total:		[15]	

PHASE 3 MARK SHEET – ENGINE SERVICE		
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Work sheet 1 – Remove service parts	30	
Work sheet 1 – Replace service parts	35	
Work sheet 2 – Engine Service Part Condition Report	15	
Sub-Total:	80	
Total:	50	

TERM THREE: PHASE FOUR**Grade 10 Automotive****MAINTENANCE (SPECIFIC): Vehicle Service Task – Clutch replacement****Procedure:**

The outcome of this task is to assess the learner's skills and ability to understand the relationship between the vehicle and the maintenance thereof. This task aims at a general maintenance of a petrol vehicle and replacing of a clutch service kit. In order to save money, learners can remove parts, and then replace as if they were new parts. This PAT aims on the skills to conduct a general maintenance on vehicle.

Resources Required:

- FOUR stroke Internal Combustion engine on a stand in working condition or a motor vehicle if available.
- Clutch Service parts may be separate items but such that Learners can experience the complete unit.
- Appropriate tools and equipment to dismantle and assemble specified service parts.
- Appropriate Personal Protection Equipment (PPE).



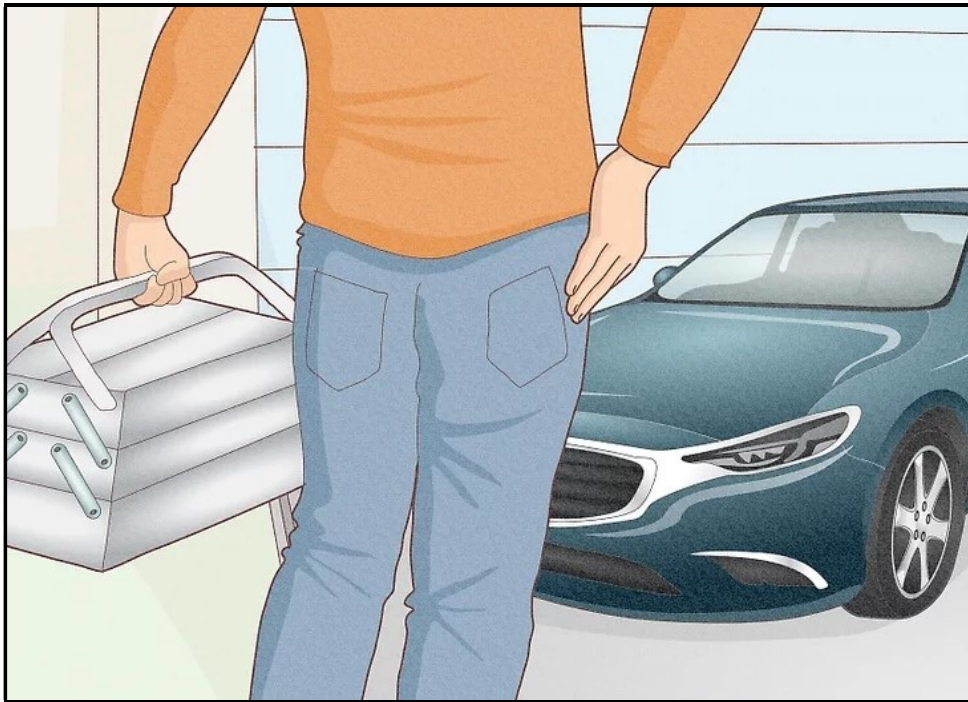
Example of a clutch kit

Instructions for Phase Four task

How to Fit a Clutch Plate:

The clutch plate is the mechanical device that allows you to shift gears in a manual transmission, and over time, it can wear down. If you notice your car is struggling to change gears, your vehicle vibrates, or it doesn't change gears at all when you shift, it may be time to replace your clutch plate. If you're an experienced mechanic, you may be able to handle the job yourself, but you may want to take your vehicle to an auto repair shop to make sure it's done right. To help you out, we've put answered a few common questions about what it takes to fit a new clutch plate into place.

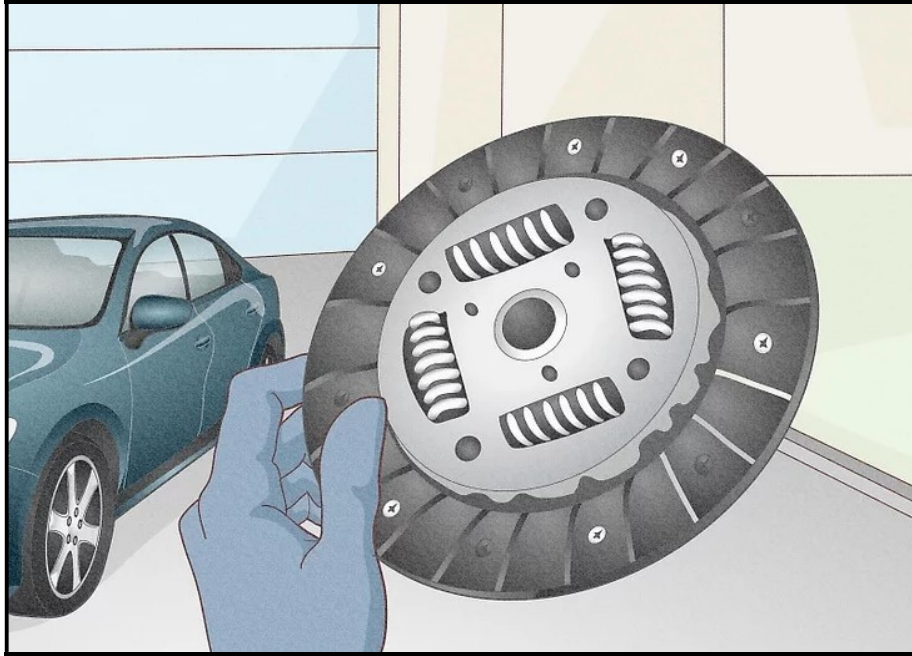
Is it hard to replace a clutch?



An experienced home mechanic can handle the task with the right tools.

If you don't have any experience working on cars, save the job for a licensed mechanic who can make sure it's done right and safely. You'll need to be able to raise the vehicle and know how to drop a transmission. You'll also need special tools like a torque wrench and a flywheel turner.

Keep in mind if the job isn't done right, you could seriously damage your transmission. If you're in doubt, have a licensed mechanic handle it.

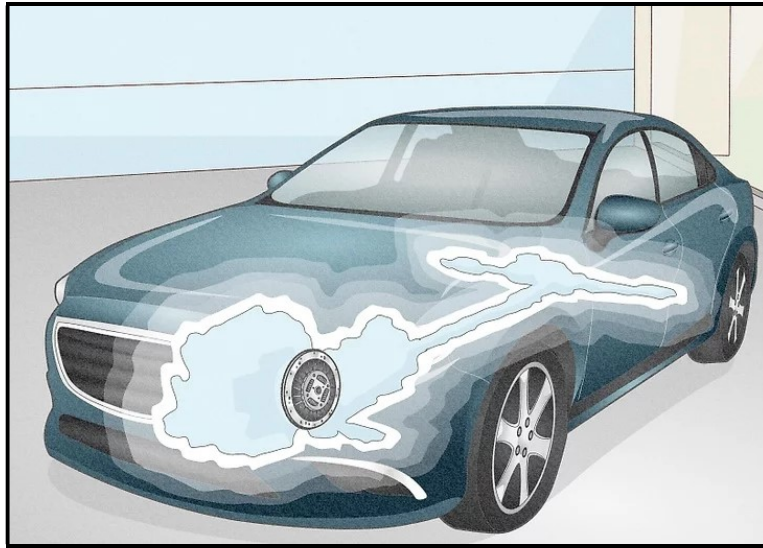
How do you choose a replacement clutch plate?

Choose a clutch kit so you have matching parts.

Clutch plates can be made out of organic, ceramic, and metallic materials. Organic materials switch your gears smoother but wear down faster than metallic materials, and ceramic clutch plates are an even mix of both. Choose a material that suits your needs and go with a full clutch kit that also includes a pressure plate that matches your clutch so everything lines up consistently.

You can also customize your pressure plates, but it's important that they're designed to fit over your clutch plate.

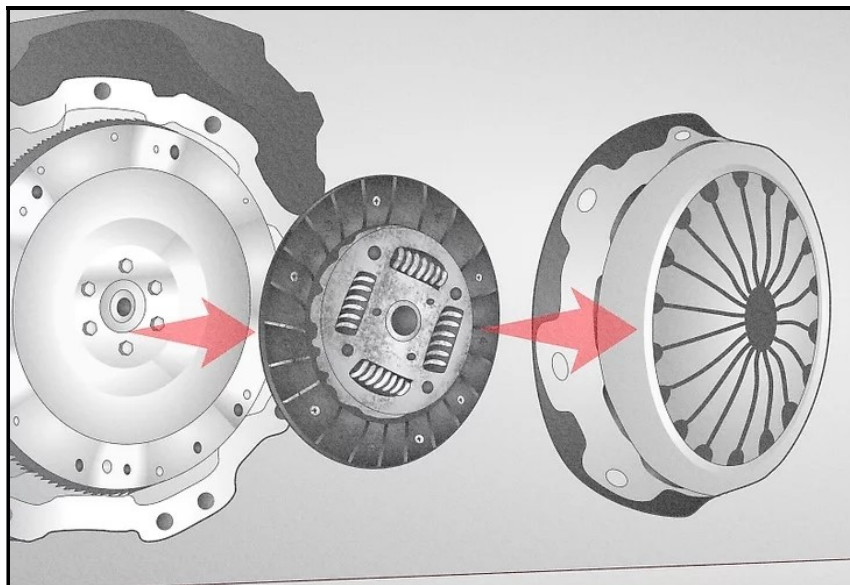
For a simpler option, choose a clutch plate that's the same as the one you're replacing.

How do you access the clutch plate?

Lift the vehicle, remove the driveshaft, and support the transmission.

Use a floor jack to lift your vehicle and then place jack stands beneath the axles to keep the vehicle safely raised. Drain the transmission oil and disconnect the driveshaft. Remove the electrical connections and bolts holding the transmission and then use a transmission jack to move it out of the way to access the clutch plate.

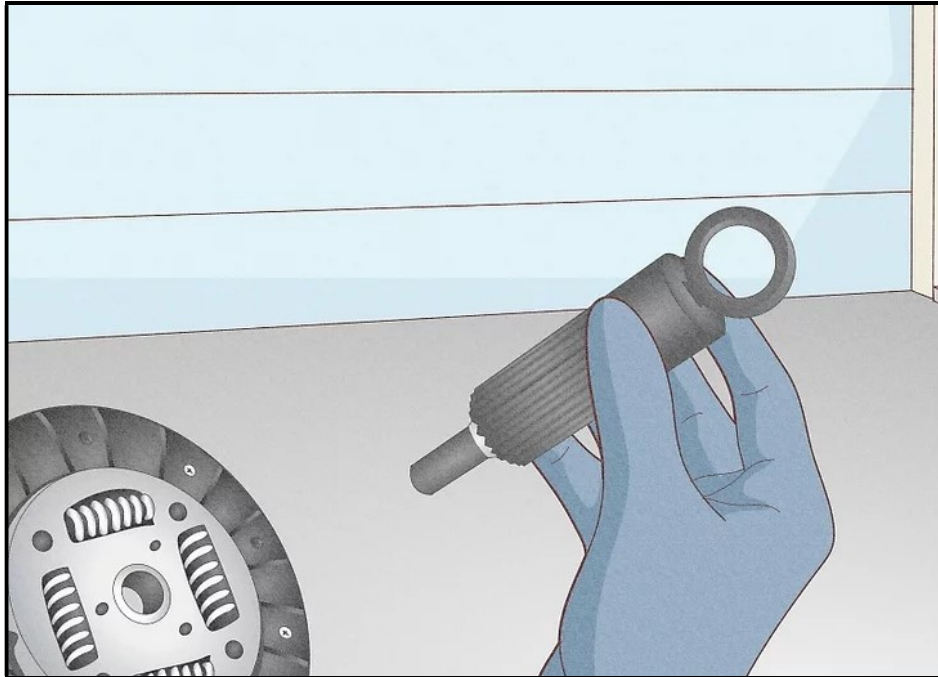
It's extremely important that you support the raised vehicle with the proper jack stands so it doesn't fall off.

How do you remove the old clutch plate?

Remove the pressure plate and pull off the old clutch plate.

Once you've got the transmission out of the way, you'll see the pressure plate. Use a wrench or drill to remove the bolts holding the pressure plate in place and remove it. Then, slide the clutch plate off of the pilot bearing shaft.

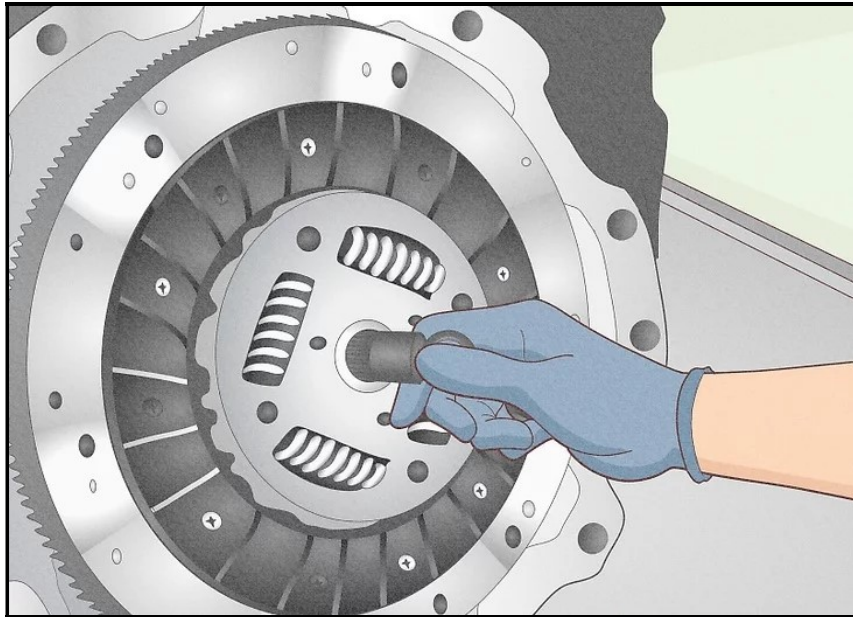
How do you connect a clutch plate to the pilot shaft?



Use a guide tool to fit the clutch plate onto the pilot bearing shaft.

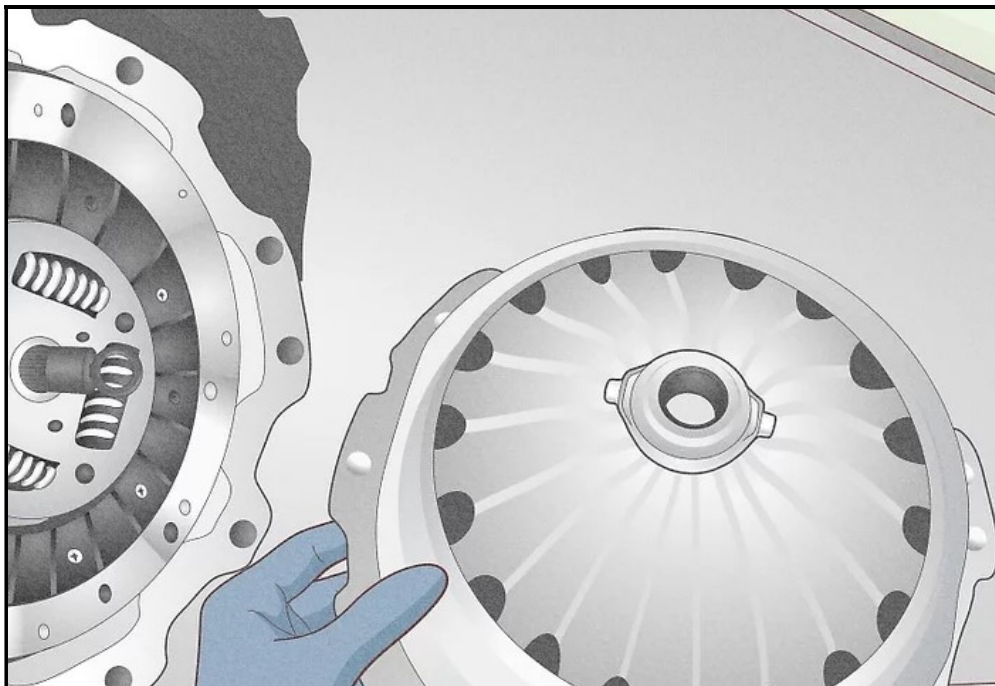
A clutch guide tool, also known as a clutch alignment tool, is a cylindrically shaped metal tool with slots that fit into the centre of your clutch and a ring on 1 end. Insert the guide tool into the centre of your clutch, then push the thinner end of the tool into your drive shaft as far as it will go.

The alignment tool is designed to hold your clutch at the perfect distance from the transmission.

Which way does a clutch plate go in?

Always place the flat side of the clutch plate against the motor.

Take a look at your clutch plate. You'll see springs that stick out more on 1 side, leaving the other side more or less flat. The flat side faces against the transmission in the bell housing.

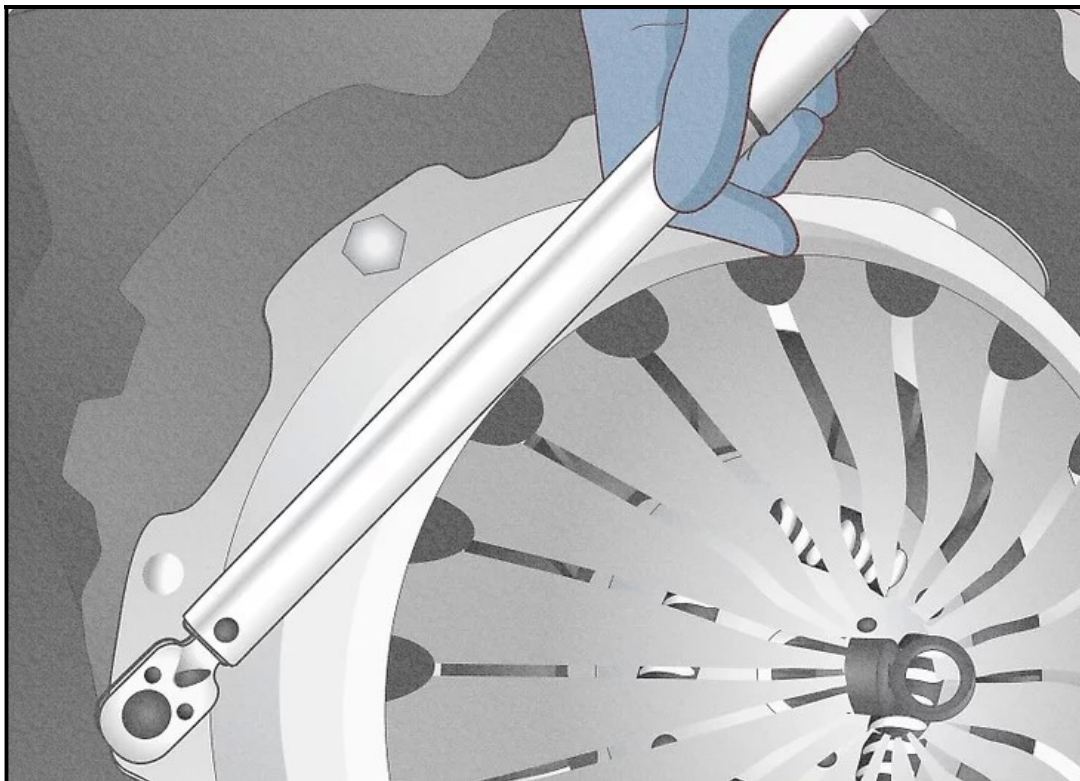
Can you replace just the clutch plate?

Replace the thrust bearing, pressure plate, and slave cylinder.

Your thrust bearing helps your clutch spin freely when you change gears and takes a lot of abuse over time. Your pressure plate also has to deal with a lot of tension and can start to bend or crack. The slave cylinder helps your clutch plate move when you press on the clutch pedal and can eventually leak or seize. Since you'll already be accessing the inner components when you change your clutch plate, it's a great time to also replace these parts.

Additionally, many clutch kits come with matching clutch plates and pressure plates. Replace both at the same time so they line up perfectly.

How do you connect the pressure plate to the clutch plate?



Install the pressure plate and torque the bolts in a criss-cross pattern.

Cover the clutch with the pressure plate and insert the holding screws into each of the slots by hand. Check the owner's manual to find the torque specs for your specific vehicle's pressure plate and adjust your torque wrench to match. Torque 1 bolt, then torque the bolt directly across from it. Continue torquing in a criss-cross or star-shaped pattern until all of the bolts are tightened.

For example, if your owner's manual says your pressure plate needs to be torqued down to 29 Nm, then set your torque wrench to match it.

WORKSHEET 4.1

LEARNER NAME:

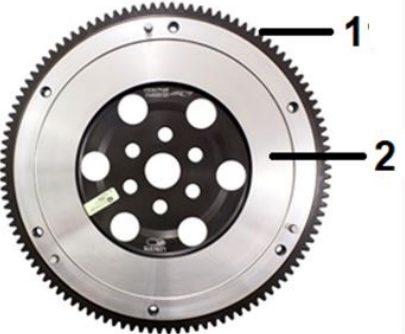
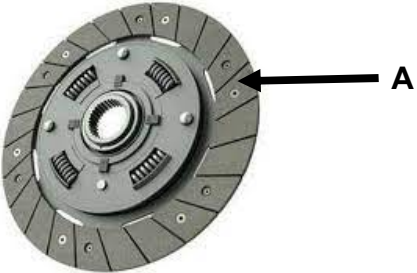
The Component/Part Die Part / Onderdeel	INSTRUCTIONS	ANSWERS	Marks Punte
 Figure 4.1	1. Identify the component in Figure 4.1.		1
	2. Explain the function of component no 1.		2
	3. What is the purpose of the smooth surface no 2?		1
 Figure 4.2	1. Identify the component in Figure 4.2.		1
	2. Explain the function of the component in Figure 4.2		2
	3. What is the purpose of the surface indicated as A?		1

 Figure 4.3	1. Identify the component in Figure 4.3.		1	
	2. Explain the function of component in Figure 4.3.		2	
	3. What is the purpose of the fins in Figure 4.3?		1	
 Figure 4.4	1. Identify the component in Figure 4.4.		1	
	2. Explain the function of component in Figure 4.4.		2	
Sub-Total:			[15]	

WORKSHEET 4.2LEARNER NAME: **PRACTICAL APPLICATION – CLUTCH ASSEMBLY SERVICE and REPLACEMENT**

Action		Marks	
Making vehicle safe	Place wheel locks behind wheels	3	
	Remove positive and negative terminals from battery	2	
	Lift vehicle in order to remove parts	2	
Remove parts	Remove power cords from starter.	2	
	Remove starter motor from gearbox.	4	
	Remove drive shaft.	5	
	Remove gearbox mountings	5	
	Remove gear lever (back wheel drive) / gear lever links (front wheel drive).	4	
	Remove speedometer cable from gearbox.	2	
	Remove clutch cable from link.	2	
	Remove gearbox bolts.	5	
	Remove gearbox from engine.	2	
	Remove springs from release bearing fork.	2	
	Remove release bearing fork.	2	
	Remove release bearing.	2	
	Release bolts from pressure plate.	6	
	Remove pressure plate.	2	
	Remove clutch plate.	2	
	Safe usage of tools and equipment.	3	
Sub-total:		[57]	

WORKSHEET 4.3LEARNER NAME: **PRACTICAL APPLICATION – CLUTCH ASSEMBLY SERVICE and REPLACEMENT**

Action		Marks	
Replace parts	Inspect flywheel surface for damage and not bent.	2	
	Replace clutch plate.	2	
	Replace pressure plate.	6	
	Line up clutch and pressure plate with clutch guide tool.	3	
	Obtain torque specifications from manufacturers manual.	2	
	Torque pressure plate bolts.	6	
	Replace release bearing and fork in gearbox.	4	
	Replace gearbox and tighten all bolts.	6	
	Replace speedometer cable in gearbox.	2	
	Replace drive shaft.	5	
	Replace starter motor to gearbox.	4	
	Replace starter motor wiring.	2	
	Replace clutch cable links.	2	
	Replace gear lever / gear lever links.	4	
	Replace battery terminals.	2	
	Start engine and test clutch release distance and set clutch accordingly to correct release distance.	3	
	Safe and correct use of tools.	3	
Sub-total:		[58]	

WORKSHEET 4.4LEARNER NAME: **CONDITION REPORT – CLUTCH ASSEMBLY SERVICE and REPLACEMENT**

Parts	Part Condition Report	Marks	
Clutch plate		5	
Pressure plate		4	
Release bearing		4	
Drive shaft		5	
Flywheel surface		2	
Sub-total:		[20]	

MARK SHEET – ENGINE SERVICE

Work sheet 1 – Theory – Identification of parts	15	
Work sheet 2 – Remove parts	57	
Work sheet 3 – Replace parts	58	
Work sheet 4 – Part Condition Report	20	
Sub-Total:	150	
Total:	100	

GRADE 10
PRACTICAL ASSESSMENT TASKS
PHASES ONE, TWO, THREE and FOUR

ANNEXURE A

DECLARATION OF AUTHENTICITY

NAME OF THE SCHOOL:

NAME OF LEARNER:
(FULL NAME(S) AND SURNAME)

EXAMINATION or I.D. NUMBER:

NAME OF TEACHER:



I hereby declare that the project submitted for assessment is my own, original work and has not been previously submitted for moderation.

SIGNATURE OF CANDIDATE

DATE

As far as I know, the above declaration by the candidate is true and I accept that the work offered is his or her own.

SIGNATURE OF TEACHER

DATE