Grade 10 Power Mechanics

Term 2 - 32 complete lesson plans

Ready to teach, in the KICD lesson-plan format | 40-minute lessons | PDF and editable Word

ABOUT THIS PACK

32 complete, ready-to-teach Grade 10 Power Mechanics lesson plans for Term 2, covering road wheels, vehicle body and vehicle chassis.

TOPICS IN THIS PACK

Topic	Name	Lessons
3.1	Road wheels	12
3.2	Vehicle body	10
3.3	Vehicle chassis	10

INSIDE EVERY LESSON PLAN

- The specific learning outcomes, key inquiry question, core competencies, values and PCIs, and the resources needed.
- A timed lesson flow: what the teacher does and what the learners do, from introduction to summary.
- The key content (a worked example, notes or a practical with its expected results), then four practice questions with the answers for the teacher.
- The common mistake to watch for, and ideas for learners who need support and for those ready for more.
- A four-level CBC assessment rubric (EE, ME, AE, BE), homework, and a blank reflection space to fill in after teaching.

A TASTE OF LESSON 1

Functions and requirements of road wheels

By the end of the lesson, the learner should be able to: a) state the functions of a road wheel and its tyre; b) state the requirements a good wheel must meet

> **What a road wheel does**
> The road wheel, with its tyre, is the only part of the vehicle that touches the road. Its functions are to carry the weight of the vehicle and its load; to pass the driving force from the engine to the road so the vehicle moves; to pass the braking force to the road so it slows and stops; to turn with the steering so the vehicle changes direction; and, with the tyre and suspension, to soften the shocks from the road.

You also receive this pack as an editable Word file, so you can change any lesson to suit your class before you print it. Lessons follow the order of the KICD curriculum design.

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Functions and requirements of road wheels

Strand 3.0 Vehicle Systems > Sub-strand 3.1 Road wheels | Lesson 1 of 12 | 40 minutes

SCHOOL	TEACHER	DATE
CLASS / STREAM	TIME	ROLL (B / G)

SPECIFIC LEARNING OUTCOME(S)

By the end of the lesson, the learner should be able to: a) state the functions of a road wheel and its tyre; b) state the requirements a good wheel must meet

KEY INQUIRY QUESTION(S)

- Why is it important to study road wheels?

CORE COMPETENCIES, VALUES AND PCIS IN THIS LESSON

COMPETENCY	**Learning to learn**	Learners say what they found easy or hard and decide their next step.
COMPETENCY	**Communication and collaboration**	Learners explain their thinking to a partner and report their findings to the group.
COMPETENCY	**Digital literacy**	Learners use a phone, tablet or the class computer to explore or check the idea.
VALUE	**Unity**	Learners share materials fairly and work as one team.
VALUE	**Respect**	Learners listen while others explain and accept correction politely.
PCI	**Social cohesion**	Learners work in harmony, include everyone and settle differences peacefully.
PCI	**Decision making**	Developed through the activities in this lesson.

LEARNING RESOURCES

A wheel with a tyre, or pictures of one | A cut section of a tyre or a chart showing tyre construction | Charts of tyre markings and tread wear patterns | Manila paper and marker pens | Notebooks and pencils

ORGANISATION OF LEARNING

Whole class for demonstrations and reading markings; pairs for inspection and calculations; groups of four for the wheel change, pressure check and puncture repair; every practical is supervised by the teacher, with jacking and stand rules from Topic 1.4 followed each time.

KEY WORDS

rim | hub | tyre | tread | sidewall | bead | radial | tubeless | balancing | alignment

THE LESSON AT A GLANCE

Introduction	Teacher models	Guided practice	On their own	Wrap-up
6 min	9 min	10 min	9 min	6 min

LESSON FLOW

Stage	Minutes	The teacher	The learners
Introduction	6	Greet the class and ask: "A car stands on four small patches of rubber, each about the size of a hand. Why are these four patches so important to everything the driver does?" Take two or three answers, link them to earlier work, then state today's outcome.	Answer the starter question, recall what they already know and read the outcome aloud.
Step 1: Teacher models	9	Take learners through "What a road wheel does" (key ideas on the next page), explaining as you go. Use a wheel with a tyre, or pictures of one, a cut section of a tyre or a chart showing tyre construction, charts of tyre markings and tread wear patterns. Ask learners to predict what comes next before you show it.	Watch, predict the next step, ask questions and note the key steps in their exercise books.
Step 2: Guided practice	10	Give questions 1 and 2. Move round the groups, ask "How do you know?" and correct errors kindly on the spot.	Work in pairs or small groups, explain each step to a partner and check one another's answers.
Step 3: Independent practice	9	Set questions 3 and 4 for individual work. Mark as you walk round and note who needs help in the next lesson.	Work on their own, then swap books with a partner to check.
Summary and conclusion	6	Ask two or three learners to state the key idea in their own words. Give this exit question and check the answers: "Name two requirements of a good wheel."	Say the key idea in their own words and answer the exit question in the exercise book.

KEY IDEAS

What a road wheel does

The road wheel, with its tyre, is the only part of the vehicle that touches the road. Its functions are to carry the weight of the vehicle and its load; to pass the driving force from the engine to the road so the vehicle moves; to pass the braking force to the road so it slows and stops; to turn with the steering so the vehicle changes direction; and, with the tyre and suspension, to soften the shocks from the road.

Weight is shared between the wheels. A vehicle that has a mass of 1200 kg and rests evenly on four wheels puts 1200 ÷ 4 = 300 kg on each. In practice the load is not even: the front of a car with the engine is heavier, and a loaded pickup presses harder on the rear.

Requirements: the wheel must be strong enough to carry the load and the shocks, light (the wheel is unsprung mass, so a lighter wheel follows bumps better and gives a smoother ride and better grip), round and well balanced so it does not vibrate, resistant to heat and rust, easy to remove and fit, and not too costly.

PRACTICE QUESTIONS - WITH ANSWERS FOR THE TEACHER

No.	Question	Answer
1	State three functions of a road wheel.	**For example: it carries the weight of the vehicle; it passes driving force to the road; it passes braking force to the road; it turns with the steering; it helps absorb shocks.**
2	A vehicle has a mass of 1600 kg on four wheels resting evenly. What is the mass on each wheel?	**1600 ÷ 4 = 400 kg.**
3	Why is a light wheel better than a heavy one?	**A light wheel is easier for the suspension to keep on the road over bumps, giving a smoother ride, better grip and better handling.**
4	Name two requirements of a good wheel.	**For example: strong, light, well balanced, resistant to rust and heat, easy to fit.**

WATCH OUT FOR

Learners think a wheel is just a rim and a tyre that turns. The wheel also carries braking and driving forces, and any fault in it affects the safety of the whole vehicle.

ASSESSMENT RUBRIC - THE FOUR CBC LEVELS

Level	What the learner can do
Exceeds expectations (EE)	Can state the functions of a road wheel and its tyre confidently and accurately, explain the method used, and apply the idea to new or unfamiliar problems.
Meets expectations (ME)	Can state the functions of a road wheel and its tyre accurately in familiar situations; notices and corrects slips without help.
Approaches expectations (AE)	Can partly state the functions of a road wheel and its tyre, or does so with prompts from the teacher or a partner; makes some errors.
Below expectations (BE)	Cannot yet state the functions of a road wheel and its tyre without direct help; needs the idea taught again with concrete objects.

SUPPORT AND EXTENSION

Learners who need support	Give a picture of a vehicle with arrows to fill in: weight down, driving force forward, braking force backward, steering sideways.
Learners ready for more	Explain why a wheel that is not well balanced makes the steering wheel shake at speed. (Answer: The heavy spot on the wheel is flung around as it turns and pulls on the axle with each rotation, and the vibration passes up through the steering to the driver)
Inclusion	Seat learners with low vision near the board and read aloud whatever you write; use large, clear, tactile materials; allow extra time; pair with a patient partner; use gestures or Kenyan Sign Language for the key words.

HOMEWORK AND FOLLOW-UP

Redo questions 3 and 4 neatly in the exercise book. Then tell someone at home what you learned about "functions and requirements of road wheels" and bring one question of your own to ask next lesson.

TEACHER SELF-CHECK

- Did every learner get a turn to handle materials or explain their thinking?
- Did most learners meet the outcome? Write down the names of those who did not.
- Was the pace right — did any step take too long or too short a time?
- Which competency and value did I see learners showing?
- What will I change the next time I teach this lesson?

REFLECTION ON THE LESSON / SELF-REMARKS

Write this after teaching - what worked, what to change, which learners need follow-up.

Parts of a wheel assembly

Strand 3.0 Vehicle Systems > Sub-strand 3.1 Road wheels | Lesson 2 of 12 | 40 minutes

SCHOOL	TEACHER	DATE
CLASS / STREAM	TIME	ROLL (B / G)

SPECIFIC LEARNING OUTCOME(S)

By the end of the lesson, the learner should be able to: a) name the parts of a wheel assembly and state the job of each; b) describe the shape of a rim

KEY INQUIRY QUESTION(S)

- Why is it important to study road wheels?

CORE COMPETENCIES, VALUES AND PCIS IN THIS LESSON

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