



EUROPA REFERENCE BOOKS  
for Automotive Technology

# Automotive Technology Basic Worksheets

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"Automotive Technology – Basic Worksheets" contains worksheets for the following subject areas:

**Service, Repairs, Diagnosis, Conversions and Retrofits.**

The worksheets are designed to form a foundation for operational situations.

- In each subject area, practical situations serve as an introduction to the topical contents. Comprehensive assignments provide the necessary basic technical knowledge. The learning situations found at the beginning of each topic can then be solved with this basic knowledge.
- Clearly outlined assignments can be solved independently in groups or with an instructor with the help of the "Modern Automotive Technology" textbook as well as the reference table.
- Circuit diagrams, maintenance schedules and work plans as well as functional descriptions are chosen such that they can be processed similarly to comparable job-related workflows.
- With the help of the accompanying ESI-Tronic CD, the student can obtain information and work on customised exercises.
- Content on operational organisation, operational communication and quality management can be found in the Service worksheets in the form of practical tasks.
- An example of a vehicle registration certificate, Part I, for registered vehicles in Europe, can be found on the inside back cover. Such documents are required to identify the vehicle during repair work and in locating spare parts in dealerships and auto parts stores.

The following tasks are given in the four subject areas:

**1 SERVICE**

Maintaining and inspecting vehicles and systems according to specifications.

**2 REPAIRS**

Checking, disassembling, exchanging and assembling simple components and systems.

**3 DIAGNOSIS**

Identify and eliminate malfunctions

**4 CONVERSIONS AND RETROFITS**

Performing customer-driven conversions

The worksheets, along with other vehicle technology textbooks such as "Modern Automotive Technology", Verlag Europa-Lehrmittel (ISBN 978-3-8085-23025), form a complete unit.

They are intended to help in carrying out practice-orientated lessons.

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### 4 CONVERSIONS AND RETROFITS

#### Performing customer-driven conversions

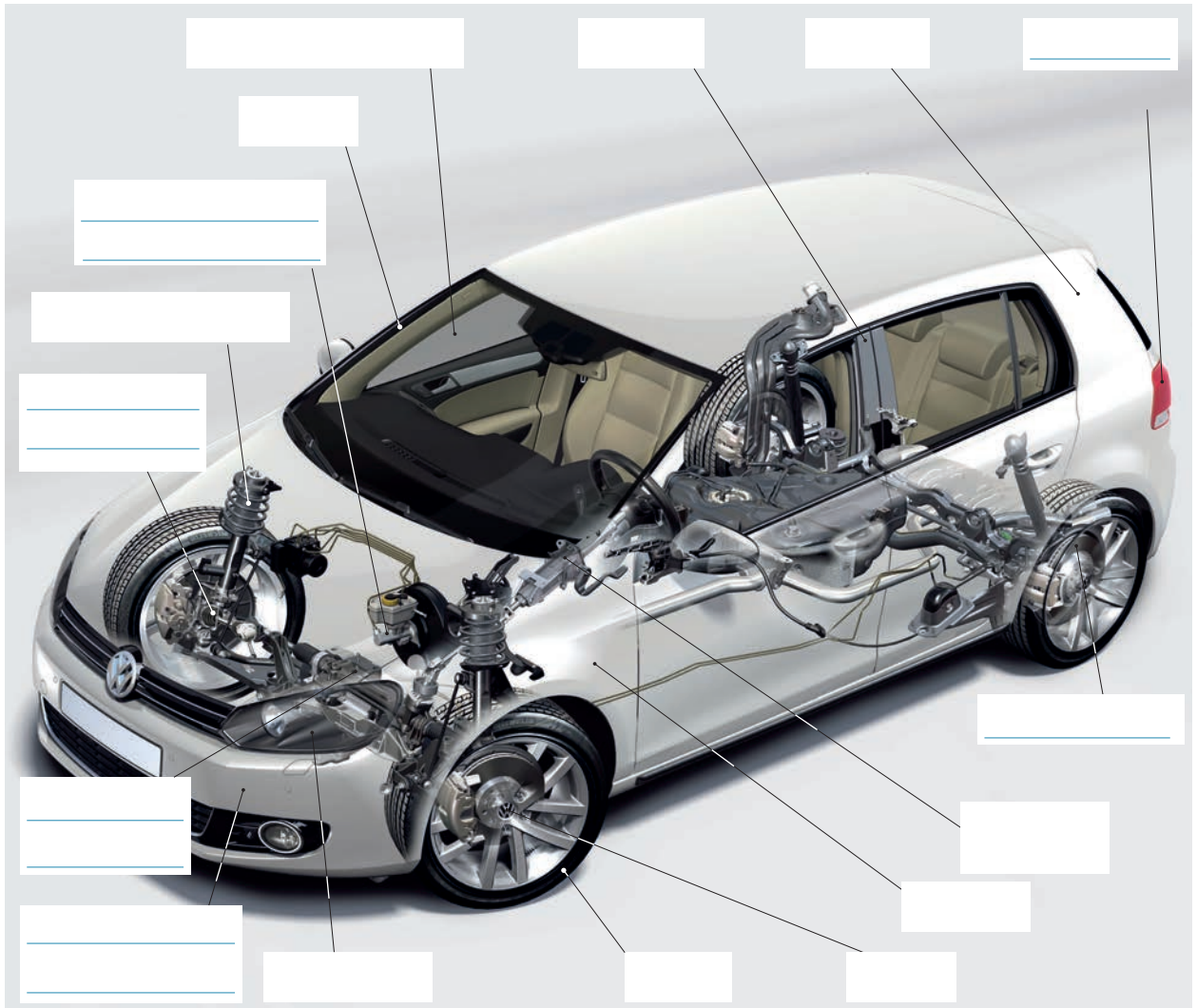
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Name: _____		
Class: _____	Date: _____	Sheet No.: _____

The use of technical terms is required in on- and off-the-job communication.

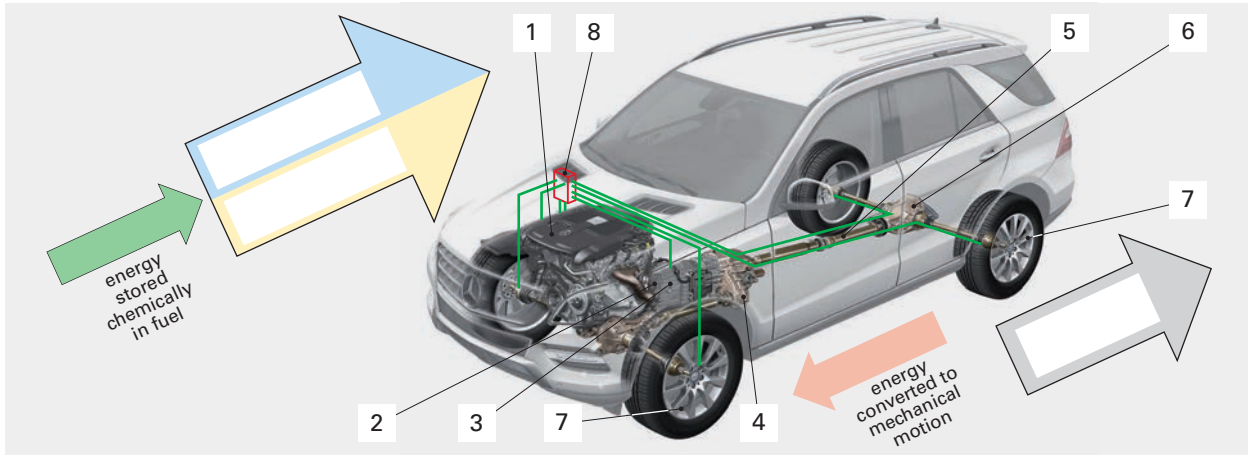
1. Identify the parts and component groups.



2. Fill in the table with the correct part and its function.

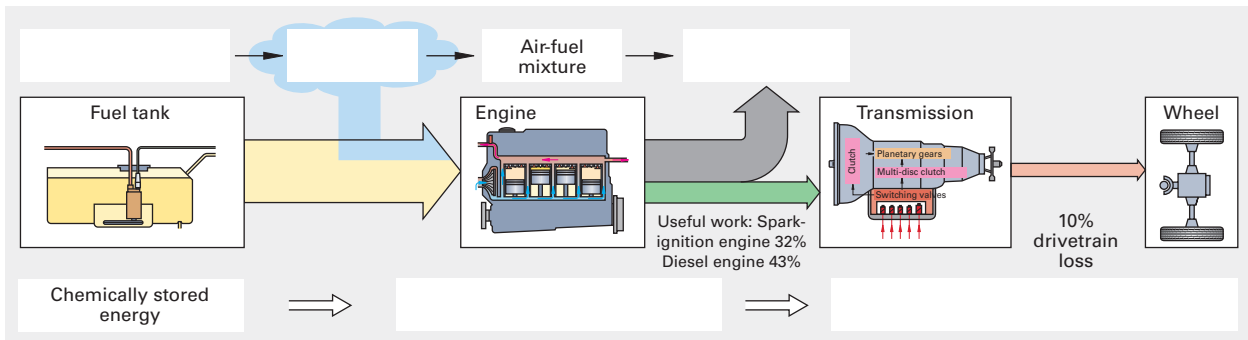
Component-group	Part	Function
Wheel	_____	_____
Springs, dampers	_____	_____
Steering	_____	_____
Lighting-equipment	_____	_____
Brakes	_____	_____

3. Identify the numbered drivetrain subsystems in the table and fill in their functions.



Number labels	Subsystem	Function
1	_____	Converts stored chemical energy into mechanical propulsion.
2	Clutch	_____
3	_____	_____
4	_____	Distributes torque to the front and rear axles in all-wheel-drive vehicles.
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	Collect sensor data, calculate control device parameters, control actuators.

4. In the picture, fill in the vehicle material flow for air, fuel and exhaust and the energy flow.

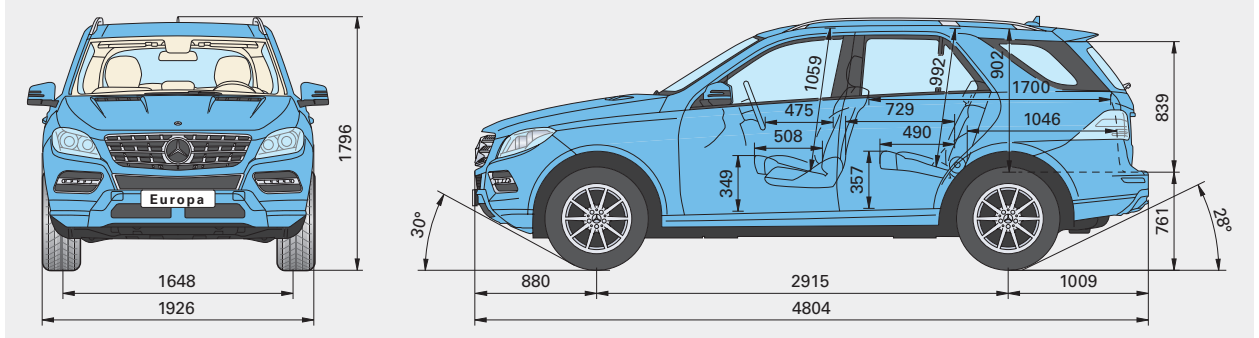


5. How much fuel energy reaches the wheel? How high are the losses? Fill in the table.

Exhaust, cooling, radiation losses in %				Driving power at the wheel in %			
Spark-ignition engine	_____	Diesel engine	_____	Spark-ignition engine	_____	Diesel engine	_____

1. Motor vehicles are divided into the following classifications.

2. Fill in the dimensions in the table and add mm or degrees.



Vehicle length	_____	Rear seat height	_____	_____	1648 mm
Vehicle height	_____	_____	2915 mm	Approach angle	_____


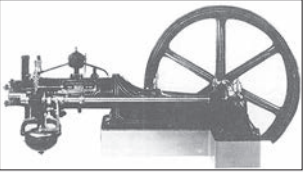

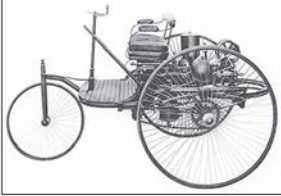
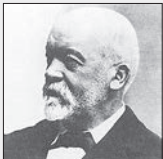
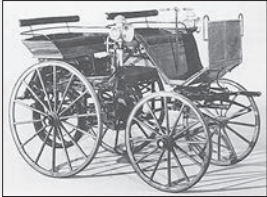

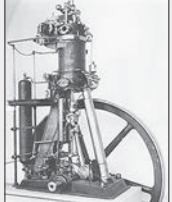

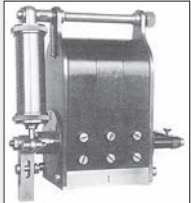

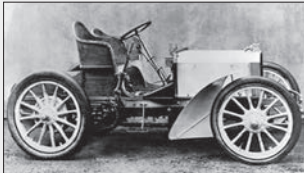
3. Identify the vehicles below and indicate their special features.

_____	_____	_____
_____	_____	_____
_____	Crossover	_____
_____	_____	_____

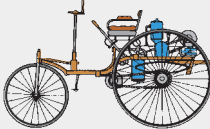

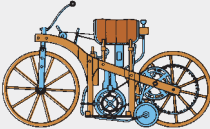

4. Which drivetrains are built into today's vehicles?

\_\_\_\_\_

### 1. Which important machines did these individuals invent?

Portrait	Invention	
 Nikolaus August Otto 1832 – 1891	_____ _____ _____ _____	
 Carl Benz 1844 – 1929	_____ _____ _____ _____	
 Gottlieb Daimler 1834 – 1900	_____ _____ _____ _____	
 Rudolf Diesel 1858 – 1913	_____ _____ _____ _____	
 Robert Bosch 1861 – 1942	_____ _____ _____ _____	
 Wilhelm Maybach 1846 – 1929	_____ _____ _____ _____	

### 2. Use the reference book to determine power, displacement and power density for the pictured vehicles.

				
Power in kW / HP	_____	_____	_____	88 / 120
Displacement in l	_____	2.0	_____	_____
Power density in kW/l	_____	77.5	_____	146.67

# 1 SERVICE

## 4-stroke spark-ignition engine

### Sheet 1

Name:

Class:

Date:

Sheet No.:

Different engine concepts are used for vehicles. Combustion engines can be categorised according to various characteristics.

1. Fill in the table.

Vehicle					
Engine					
Combustion engine categorisation according to type of...				4-stroke	
process					
cylinder motion					
ignition					
cooling					
compressed medium					
injection		direct			
carburetion					
cylinder arrangement				twin-rotor engine	
power control					

2. The cylinder arrangements pictured below are common in 4-stroke piston engines.
- Match the engine picture to its construction with an arrow.
  - Fill in the engine designation and give an example of an application (vehicle).

Figure	Matching	Construction	Description	Example-application
			_____	_____
			_____	_____
			_____	_____
			_____	_____

3. Other cylinder arrangements are illustrated in the table below. These were or are seldom built.

Fill in the table.

Figure	Matching	Construction	Description	Example application
			Double piston engine with fork connecting rod	Triumph; Puch; Java Motorcycle engines
			_____	Junkers marine, stationary and aircraft engines
			_____	Aircraft engines
			_____	Sports cars