

OBD diagnostics and NOx control

Lesson plan for teachers



Funded by the
Erasmus+ Programme
of the European Union

STEP AHEAD II

The support of Professional development of VET teachers and
trainers in following of New trends in Automotive Industry
Automotive Innovation & Teacher training Academy
2018-1-SK01-KA202-046334



OBD diagnostics and NO_x control

The aim of the lesson:

Make students familiar with OBD functions, diagnostics and NO_x control

Activity No.1

Part of the lesson: **EVOCATION**

Aim of the activity: Find out what students know about OBD system and its functions

Step 1	Brief description of the activity	Teacher divides the students into the groups, based on the number of students in the class and hands out the prepared KWL chart as personal copy for each student. (Attachment No. 1). Students are using the chart during the whole lesson, i.e. throughout all phases. Their task is to put down the notes about the topic. In the first step, students will write all information they already have on OBD system and its functions at that very moment (1 st column "I know").
	Instruction (what you need to tell the students)	You will be working in 4 groups. Your task is to fill the first column of the KWL chart with the heading " <i>I Know</i> " with everything you know or have heard about the OBD system. Write down everything that comes to your mind.
Step 2	Brief description of the activity	Students are continuously writing down the information into the first column of the chart (Attachment No.1). They need to formulate it in a way understandable for all students. After 3

		minutes, all groups will present what they have come up with. One of the groups will write the notes down on the blackboard.
	Instruction (what you need to tell the students)	After time runs out (3 minutes), a representative from each group presents the information.
Step 3	Brief description of the activity	Teacher/or one of the students writes down the key terms on the blackboard or flipchart into the proper column. This part of the lesson takes 7 minutes. Thereafter all information is summarized.
	Instruction (what you need to tell the students)	Now, when all information has been summarized, we can discuss your ideas and you can write them down into your charts.
Tools for the activity (everything you need to take to the classroom)		Flipchart papers, markers, chart from the attachment No.1 for every student.
Estimated time (max. 40 min.)		10 minutes
Notes		While writing the notes from the group brainstorming, leave some space for other two columns on the blackboard with the following headings <i>I Want To Know</i> and <i>I Learned</i>

Activity No. 2

Part of the lesson: **APPRECIATION**

The aim of the activity: Understanding the functioning and advantages of the OBD system

Step 1	Brief description of the activity	<p>Teacher hands out to the students the article on OBD system and checking the NO_x, concerning the constructions, signalisation on dashboard, codes to evaluate NO_x (Attachment No. 2). The students' task is to read it and mark concrete passages of the text with the following symbols:</p> <p>√ what I already know</p> <p>+ what was new for me</p> <p>? what I want to know</p> <p>- what was in contrast to what I originally thought</p> <p>Teacher writes the symbols and their legend on the blackboard.</p>
	Instruction (what you need to tell the students)	<p>Now, you will continue in a group work. Each group will be handed out an article on OBD. Your task is to read it and note using the following symbols:</p> <p>√ what I already know</p> <p>+ what was new for me</p> <p>? what I want to know</p> <p>- what was in contrast to what I originally thought</p>
Step 2	Brief description of the activity	<p>Gathering and summarizing the information from students. Teacher will ask one representative from each group to present their notes.</p> <p>The information marked "√" will be summarized and written into the first column of KWL chart "I know" (Attachment No. 1), information marked "+" will be added into the first column, too.</p> <p>Information marked by "?", will be written in a second column of KWL "I want to know". On the information marked "-" students decide in which of the 3 columns of the KWL chart they prefer to include it.</p> <p>After having this activity completed, teacher asks students few questions to rise a discussion. In the questions that were not answered yet in "I Want To Know" column he will relate to the article</p>

		to find the answers. If any question remains without answer, students can search for additional information on internet.
	Instruction (what you need to tell the students)	Now, every group will present their information acquired from the article, and together we add it into the relevant column of KWL chart.
Tools for the activity (everything you need to take to the classroom)		An article on OBD (Attachment No. 2), KWL chart (Attachment No. 1)
Estimated time (max. 40 min.)		25 minutes
Notes		None

Activity No. 3

Part of the lesson: **REFLECTION**

The aim of the activity: Affirmation of the knowledge acquired on OBD and NO_x checking

Step 1	Brief description of the activity	<p>Using the method of <i>“Unfinished Sentences”</i> + method of <i>“Rotating Flips”</i> students will affirm and reflect on their knowledge gained from the lesson.</p> <p>Teacher hands out the paper with unfinished sentences (Attachment No. 3), which must be filled with the information from the article on OBD and NO_x acquired during the previous activities. Students write what they know – work on finishing the sentences and then pass their flip to the other group, who checks what was written and add more information if needed. Each flip has to be seen and reviewed by each group.</p>
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	Instruction (what you need to tell the students)	You will continue in a group work. Every group will be handed out a piece of flip paper with several sentences. Your task is to finish the sentence or complete it with missing expressions. If you think you wrote everything you wanted to, please pass on your flip paper to the next group. Papers will rotate in a classroom until every group will receive its own paper. Then, present your results.
	Tools for the activity (everything you need to take to the classroom)	Blackboard / Flipchart to write the notes on, flip paper for each group, markers, unfinished sentences (Attachment No. 3), markers
	Estimated time (max. 40 min.)	10 minutes
	Notes	none

ANNEX 1
(KWL chart)

I Know	I Want To Know	I Learned

ANNEX 2:

Document for individual use for each student: Attachment No. 2 – OBD (On Board Diagnostics) and NOx control, please see separate pdf file

ANNEX 3:

Exercises with unfinished sentences. Sentences can be divided among the groups as needed.

1. OBD (On Board Diagnostics) is a _____ within the _____ which was _____ in _____ .

2. The new law is called NOx _____ and means that there is a requirement to _____ the level of nitrogen oxides (NOx level) in the _____ gases.

3. Depending on how great an effect the fault has on the NO_x level, the vehicle _____ is limited either by _____ % as soon as the vehicle is stopped (speed is 0 km/h), or after _____ hours _____ time.

4. If the malfunction influences the increase of NO_x to allowed _____ , maximum _____ will be limited to _____ 40%.

5. The information must be stored in the control for _____ days or _____ hours.

6. If the vehicle has a _____ that causes the _____ limit value to be exceeded, the driver must be _____ at the same time as the _____ torque of the vehicle is limited.

NOTES:



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