

Bruner's E3: Explanation Lens

Process	4C Super Skill	Engine Management System Activity
<p>1) After connecting the scan-tool with a scope probe, insert the probe into a check terminal wish to measuring. (Be sure to connect the grounding cable).</p> <p>2) On the initial main screen, enter [SCOPE] and select [SINGLE AUTO SET (CH1)].</p> <p>3) The wave form is measured according to the adjustment of time axis and voltage axis.</p>	Communicating	<p>Explain to the teacher your personal understanding of waveform analysis and its importance in diagnosing engine issues.</p> <p>Reinforce or challenge the instructions provided for using the scope probe, discussing the steps with classmates to ensure everyone understands the process.</p>
	Collaborating	<p>Conduct a Round-Robin of Four-Ways-Interviews with classmates to gather insights on using scope probes, then discuss findings to develop a comprehensive understanding of the process.</p> <p>Use the Think-Pair-Square cooperative learning structure to explain the purpose of waveform measurement and analysis to team members, encouraging equal participation in exploring the topic.</p>
	Critical Thinking and Problem Solving	<p>Demonstrate how the waveform measurement process works by setting up a simulated experiment and explaining it to the class, fostering critical thinking about the application of the process.</p> <p>Analyze past diagnostic data and explain how it can be linked to new waveform measurements to diagnose engine issues effectively, promoting problem-solving skills in diagnostic procedures.</p> <p>Use a Venn graphic organizer to compare and contrast different waveform patterns observed during diagnostics, explaining the significance of each pattern in identifying specific engine problems.</p>
	Creating and Innovating	<p>Link past diagnostic events to new learning occurrences by developing hypotheses about potential engine issues based on waveform analysis, fostering innovation in diagnostic</p>

		<p>approaches.</p> <p>Create a glossary of terms related to waveform analysis and explain them to the class, enhancing understanding of technical terminology used in engine diagnostics.</p> <p>Use digital-imaging technology to create visual representations of waveform patterns and their significance in diagnosing engine issues, facilitating comprehension and engagement in the diagnostic process.</p>
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<p>1) Turn on the 'IGNITION KEY' and activate the system.</p> <p>2) Locate the scanner in better place to measure and insert the connector into the D.L.C terminal.</p> <p>3) When power on the scanner, the initial main screen will be displayed.</p>	Communicating	<p>Explain to the teacher the process of activating the system, including the steps involved in turning on the ignition key and locating the scanner.</p> <p>Reinforce or challenge the information provided by discussing personal understanding and experiences with activating engine management systems.</p>
	Collaborating	<p>Conduct a Round-Robin of Four-Ways-Interviews to gather different perspectives on system activation from team members. Discuss and probe each other's contributions.</p> <p>Use the Think-Pair-Square cooperative learning structure to explain the activation process to team members, encouraging equal participation and understanding.</p>
	Critical Thinking and Problem Solving	<p>Demonstrate how the system activation works by setting up an experiment and explaining its functionality to the class. Look for patterns in data related to system activation.</p> <p>Apply past knowledge and experiences to resolve any challenges encountered during system activation, such as interpreting data from the initial main screen of the scanner.</p>
	Creating and Innovating	<p>Link past experiences with new learning by developing hypotheses about the effects of different activation methods. Create a glossary of terms related to engine management.</p> <p>Use digital-imaging technology to create graphics or visual aids explaining the concepts and processes involved in engine management system activation.</p>

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<p>1) Select [Scan] on the main screen, then select [ENHANCED SCAN] on the selection screen.</p> <p>2) Select [KOREAN] in the country selection screen, then select [HYUNDAI] in the manufacturer selection screen.</p> <p>3) Select [HYUNDAI MOTORS], then select [EF SONATA] on the vehicle model selection screen.</p> <p>4) Select [ENGINE CONTROL DOHC] on the vehicle selection submenu screen. The following screen will appear if the communication with the engine ECU is successful.</p> <p>5) A communication error screen will appear if the diagnostics cable connection is faulty or if the system malfunctions. Check the related wiring and circuits and try again.</p> <p>6) Click [SELF DIAGNOSIS] to display the trouble codes.</p> <p>7) Press [ESC] to leave the screen, then select [CURRENT DATA] to check the system's service data.</p> <p>Checklist for addressing a communication error</p>	Communicating	<p>Explain the steps involved in selecting the scan options and navigating through the diagnostic process on the scanner's interface.</p> <p>Describe the significance of each selection, such as the country, manufacturer, vehicle model, and engine type, in the diagnostic process.</p>
	Collaborating	<p>Collaborate with peers to discuss potential causes of communication errors and strategies for troubleshooting wiring and connection issues.</p> <p>Engage in group discussions to analyze diagnostic trouble codes and interpret their implications for vehicle diagnosis and repair.</p>
	Critical Thinking and Problem Solving	<p>Analyze the diagnostic process and identify possible sources of communication errors based on the checklist provided.</p> <p>Apply problem-solving skills to address communication errors by checking wiring connections, verifying vehicle type selection, and ensuring the ignition key is in the ON position.</p> <p>Investigate the root cause of communication errors and propose solutions to prevent recurrence in future diagnostic procedures.</p>
	Creating and Innovating	<p>Develop innovative techniques for diagnosing communication errors and improving diagnostic efficiency using the diagnostic tools available.</p> <p>Design and conduct experiments to test the effectiveness of different diagnostic procedures in identifying and resolving communication errors.</p>

<p>1) Check the wiring connections.</p> <p>2) Verify that the vehicle type selected corresponds to the actual vehicle.</p> <p>3) Check if the ignition key is in the ON position.</p>		
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<p>1) When the engine warning lamp continuously lights up, solve the problem by using the scanner. When they are not erased, set the variable control knob for major sensors to normal value, and erase them again.</p> <p>2) When the engine alarm lamp keeps lighting up and in an emergency condition without scanner, push the emergency stop switch and turn it on after 15 seconds to clear the memory</p>	Communicating	<p>Explain the process of using a scanner to diagnose and troubleshoot engine warning lamp issues to the teacher or classmates.</p> <p>Describe the results of previous engine diagnostic experiments and present a report detailing the outcomes to the class.</p>
	Collaborating	<p>Conduct a round-robin discussion among team members to share insights and ideas on how to interpret engine alarm lamp signals.</p> <p>Use cooperative learning structures like Think-Pair-Square to collaborate with peers in explaining the emergency memory-clearing process.</p>
	Critical Thinking and Problem Solving	<p>Demonstrate an understanding of how engine sensors and actuators function and how they contribute to warning lamp signals.</p> <p>Set up a simulated experiment to demonstrate the emergency memory-clearing process and explain its effectiveness to the class.</p> <p>Analyze past engine alarm lamp incidents to identify patterns and develop strategies for resolving them efficiently.</p>
	Creating and Innovating	<p>Develop new theories or hypotheses about the underlying causes of persistent engine warning lamp illumination and test them experimentally.</p> <p>Create visual aids, such as glossaries or digital graphics, to illustrate and explain engine management system concepts to classmates.</p>

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<p>1) When there is any trouble in the system, the ECU senses it, lighting the warning lamp.</p> <p>2) ECU changes the mode of troubled sensors and actuators into Fail Safe to control them, when engine warning lamps light up.</p>	Communicating	<p>Explain to the class how the Engine Control Unit (ECU) detects issues and illuminates the warning lamp.</p> <p>Present a report to the class explaining the function of the Fail Safe mode activated by the ECU when issues arise.</p>
	Collaborating	<p>Conduct a Round-Robin of Four-Ways-Interviews to gather insights from team members on how the ECU functions.</p> <p>Use the Think-Pair-Square cooperative learning structure to discuss the implications of the ECU's fail-safe mechanisms.</p>
	Critical Thinking and Problem Solving	<p>Demonstrate how the ECU works to control sensors and actuators when the warning lamp lights up.</p> <p>Look for patterns in engine data to diagnose the root cause of the issue triggering the warning lamp.</p> <p>Apply previous knowledge of engine systems to troubleshoot and resolve software problems related to the ECU.</p>
	Creating and Innovating	<p>Develop hypotheses about potential engine malfunctions based on ECU behavior and design experiments to test them.</p> <p>Create a glossary of terms related to engine management systems and explain them to the class.</p>

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<p>1) Check terminal is connected to sensors, actuators of EMS control circuit.</p> <p>2) Trainee exercises test of voltage, current and resistance of each check terminal of EMS with multi-tester.</p>	Communicating	<p>Trainees explain to the instructor their understanding of how the EMS control circuit operates, highlighting the role of sensors and actuators.</p> <p>Reinforce or challenge explanations provided by peers, fostering discussions to clarify concepts and deepen understanding of EMS components and testing.</p>
	Collaborating	<p>Conduct Four-Ways-Interviews among team members to discuss their understanding of EMS testing procedures and share insights to improve comprehension.</p> <p>Utilize the Think-Pair-Square cooperative learning structure to explain EMS testing methods to team members, encouraging equal participation and discussion.</p>
	Critical Thinking and Problem Solving	<p>Demonstrate how to perform voltage, current, and resistance tests on EMS check terminals, explaining the rationale behind each step of the testing process.</p> <p>Analyze data obtained from EMS testing, looking for patterns and discrepancies that may indicate sensor or actuator malfunctions, and devise solutions.</p> <p>Apply critical thinking skills to troubleshoot EMS issues, using past learning and knowledge of circuit operation to diagnose and resolve system faults.</p>
	Creating and Innovating	<p>Develop hypotheses about potential causes of EMS malfunctions based on test results, formulating new theories to explain observed patterns and anomalies.</p> <p>Create glossaries of EMS terminology and concepts, explaining their meanings to peers to enhance understanding and facilitate collaborative learning.</p>