Bruner's E4: Elaboration Lens

Process	4C Super Skill	Engine Management System Activity
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). 2) On the initial main screen, enter **[SCOPE]** and select **[SINGLE AUTO SET (CH1)].** 3) The wave form is measured according to the adjustment of time axis and voltage axis.	Communicating	Discuss and elaborate on the importance of waveform analysis in diagnosing engine issues, comparing it to previous diagnostic methods and highlighting its advantages. Share your understanding of how the waveform measurement process works with classmates, explaining the steps involved and the significance of adjusting the time and voltage axis for accurate measurements.
	Collaborating	Work in teams to broaden the understanding of waveform analysis, sharing insights and discussing different approaches to interpreting waveform patterns to diagnose engine problems effectively. Collaborate with peers to solve problems encountered during waveform analysis, seeking assistance from team members and sharing solutions to improve diagnostic procedures.
	Critical Thinking and Problem Solving	Apply critical thinking skills to search the internet for additional information on waveform analysis, exploring further points relevant to engine diagnostics and questioning current understanding to deepen knowledge. Challenge current diagnostic methods by questioning and correcting misconceptions about waveform analysis, applying theoretical knowledge to solve new engine diagnostic problems effectively. Apply waveform analysis theory to real-life experiences, such as diagnosing engine issues in practical automotive scenarios, to develop problem-solving skills in real-world diagnostic situations.
	Creating and Innovating	Raise new issues for discussion about waveform analysis, encouraging

		classmates to explore innovative approaches to engine diagnostics and apply newly acquired knowledge to different diagnostic contexts. Design and complete a rich learning task on waveform analysis, such as creating a comprehensive guide or tutorial video demonstrating the process and its application in diagnosing various engine problems. Create a video documenting the process of waveform analysis in diagnosing engine issues during a community event, showcasing the practical application of diagnostic skills learned in class.

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Process	4C Super Skill	Engine Management System Activity
1) Turn on the 'IGNITION KEY' and activate the system. 2) Locate the scanner in better place to measure and insert the connector into the D.L.C terminal. 3) When power on the scanner, the initial main screen will be displayed.	Communicating	Discuss and elaborate on the process of activating the system, including the significance of turning on the ignition key and locating the scanner. Share personal experiences and understanding of the system activation process with classmates, fostering a deeper discussion on the topic.
	Collaborating	Work collaboratively in teams to broaden understanding of the system activation process and share insights and understandings with each other. Challenge peers to provide additional information or perspectives on system activation, fostering a collaborative environment for problem-solving.
	Critical Thinking and Problem Solving	Search the internet for further information related to engine management systems, exploring theories and concepts to deepen understanding. Apply critical thinking skills to analyze and correct any misperceptions or challenges encountered during the activation process of the system. Use theory learned to solve new problems or challenges that may arise during the activation process, applying knowledge to real-life scenarios.
	Creating and Innovating	Design and complete a rich learning task related to engine management systems, incorporating new ideas and terminology to enhance understanding. Create media-rich presentations or videos demonstrating the process of system activation and share them with classmates to promote learning.

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Process	4C Super Skill	Engine Management System Activity
1) Select **[Scan]** on the main screen, then select **[ENHANCED SCAN]** on the selection screen. 2) Select **[KOREAN]** in the country selection screen, then select**[HYUNDAI]** in the manufacturer selection screen. 3) Select **[HYUNDAI MOTORS],** then select **[EF SONATA]** on the vehicle model selection screen. 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. 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. 6) Click **[SELF DIAGNOSIS]** to display the trouble codes. 7) Press **[ESC]** to leave the screen, then select **[CURRENT DATA]** to check the system's service data. **Checklist for addressing a communication error**	Communicating	Discuss in detail the process of selecting scan options, including why each step is necessary for effective diagnostics. Practice using technical language correctly to describe the diagnostic process and explain the significance of trouble codes and service data.
	Collaborating	Work in teams to analyze communication errors encountered during diagnostics and brainstorm strategies for addressing them. Share insights and understandings gained from troubleshooting communication errors with peers and seek assistance when encountering challenges.
	Critical Thinking and Problem Solving	Apply critical thinking skills to explore deeper meanings behind trouble codes and diagnostic data, linking them to potential engine issues. Utilize internet resources to research further points related to engine diagnostics and apply this knowledge to solve complex diagnostic problems. Challenge and question current diagnostic approaches to develop innovative solutions for improving diagnostic accuracy and efficiency.
	Creating and Innovating	Design and implement new methods or tools for diagnosing communication errors in engine management systems, aiming to enhance diagnostic capabilities. Experiment with different diagnostic techniques and tools to discover more efficient ways of diagnosing and resolving engine issues.

1) Check the wiring connections. 2) Verify that the vehicle type selected corresponds to the actual vehicle. 3) Check if the ignition key is in the ON position.		

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Process	4C Super Skill	Engine Management System Activity
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. 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	Communicating	Discuss in detail the process of using a scanner to troubleshoot and erase engine warning lamp signals. Present a formal explanation of the emergency memory-clearing process using correct technical language.
	Collaborating	Work collaboratively in a team to analyze and broaden understanding of engine warning lamp troubleshooting techniques. Share experiences and insights with peers to collectively solve engine management system problems and challenges.
	Critical Thinking and Problem Solving	Search the internet for additional resources and information to deepen understanding of engine warning lamp diagnostic procedures. Apply critical thinking skills to challenge and correct misconceptions about engine management system processes and functions. Analyze real-life scenarios and apply theoretical knowledge to devise effective solutions to persistent engine warning lamp issues.
	Creating and Innovating	Generate new ideas for improving engine management system diagnostics and document them in a media-rich presentation shared with peers. Design innovative strategies for extending the application of engine management system knowledge to related areas within the automotive industry.

Bruner's E4: Elaboration Lens

Process	4C Super Skill	Engine Management System Activity
1) When there is any trouble in the system, the ECU senses it, lighting the warning lamp. 2) ECU changes the mode of troubled sensors and actuators into Fail Safe to control them, when engine warning lamps light up.	Communicating	Share your understanding of how the Engine Control Unit (ECU) detects issues and activates the warning lamp. Discuss the process of how the ECU changes the mode of sensors and actuators into Fail Safe when issues arise.
	Collaborating	Work in teams to discuss and broaden understanding of engine warning systems and fail-safe mechanisms. Share insights and understandings of engine management systems with peers to collectively solve problems.
	Critical Thinking and Problem Solving	Search the Internet for further information on how engine management systems operate and troubleshoot issues. Challenge current understanding of engine diagnostics and apply theory to real-life experiences to solve problems. Question and correct misperceptions about engine warning systems to enhance critical thinking skills.
	Creating and Innovating	Design and complete a rich learning task related to engine diagnostics, such as creating a troubleshooting guide. Apply knowledge learned in one area (engine diagnostics) to other areas, such as vehicle maintenance or electronics. Develop and use new terminology related to engine management systems to facilitate communication and learning.

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Process	4C Super Skill	Engine Management System Activity
1) Check terminal is connected to sensors, actuators of EMS control circuit. 2) Trainee exercises test of voltage, currency and resistance of each check terminal of EMS with multi-tester.	Communicating	Trainees discuss and elaborate on the importance of checking terminals connected to sensors and actuators in the EMS control circuit. Practice using formal language correctly when describing the process of testing voltage, current, and resistance at each EMS terminal with a multi-tester.
	Collaborating	Work collaboratively in teams to broaden understanding of EMS diagnostics and share insights gained from testing procedures. Share understandings of EMS testing methods and work together to solve any encountered problems or challenges during the testing process.
	Critical Thinking and Problem Solving	Look for deeper meanings in EMS concepts and theories, questioning assumptions and challenging current understanding to enhance diagnostic skills. Apply critical thinking skills to analyze EMS test results, identifying discrepancies and potential issues with sensor or actuator performance. Apply theory learned to real-life scenarios, using EMS diagnostic techniques to troubleshoot and solve problems in actual engine systems.
	Creating and Innovating	Raise new issues and propose innovative solutions to enhance EMS diagnostics and improve engine performance. Design and complete rich learning tasks related to EMS testing, such as creating tutorials or guides to share knowledge with peers. Develop new terminology or strategies for EMS diagnostics and apply these in real-world situations to optimize engine management.