Implementation of Biogas Project Assignment in STEAM-Based Learning to Develop Students' Creativity

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Abstract

The objective of this study is to explore the impact of a STEAM-based biogas project-based learning approach on the creativity of seventh-grade students at MTs Negeri 06 Jember. This study used a descriptive qualitative approach. It involved 25 students. The students were divided into three groups. For two weeks, students carried out a biogas prototyping project with different organic waste materials and varied fermentation methods. The research instruments included creativity observation sheets and student worksheet assessment, with creativity indicators including originality of ideas, flexibility of thinking, integration across STEAM disciplines, visual expression, and perseverance. The results showed that all groups succeeded in developing a simple biogas model and obtained creativity scores and student worksheet scores in the good to excellent category. STEAM project-based learning proved effective in improving students' creative thinking skills, understanding of science concepts, and environmental awareness. Thus, this approach is recommended to be applied in environment-based contextual learning at the junior high school level.

Keywords: Biogas, Creativity, STEAM-Based Learning

1. Introduction

The rapid development of science and technology in the 21st century requires a paradigm shift in education, particularly concerning cultivating higher-order thinking skills such as creativity, problem-solving, and collaboration (Mu'minah, 2021). Creativity is one of the main competencies that students must have to face global challenges, including in dealing with increasingly complex environmental and energy issues (Abidah et al., 2022).

The STEAM-based learning approach (Science, Technology, Engineering, Arts, and Mathematics) is an innovative alternative that encourages the development of more comprehensive creativity (Mustoip et al., 2024). The addition of Arts in STEM to STEAM is intended to strengthen aspects of aesthetics, imagination, and creative expression that were previously less accommodated in pure science and technology-based approaches (Connor et al., 2015). Adding arts to STEM creates STEAM, expanding the learning dimension to include aesthetics, design, expression, and imagination. These aspects were previously underrepresented in science and technology-based approaches alone (Permana et al., 2023). This integration of art elements is believed to be able to foster aesthetic sensitivity and strengthen divergent thinking skills, which are the foundation of creative thinking.

Several previous studies have demonstrated the effectiveness of the STEAM approach in enhancing students' creative thinking and problem-solving skills. STEAM-based learning provides students with opportunities to integrate interdisciplinary knowledge and develop innovative solutions to real-world problems (Yakman & Lee, 2019). Similarly, research findings affirm that the inclusion of the arts in STEAM not only enriches cognitive processes but also supports the development of students' creative identity through aesthetic and reflective activities (Perales & Aróstegui, 2024). In the context of education in Indonesia, studies have found that the implementation of STEAM-based projects significantly improves student engagement (Rahayu & Amanahtillah, 2024), scientific conceptual understanding (Jelita & Mazlan, 2023), as well as collaborative (Nurramadhani et al., 2021) and creative skills (Arsy & Syamsulrizal, 2021). These findings indicate that the integration of the STEAM approach in learning is not only globally relevant but also contextually aligned with the national education framework.

Project-based learning (PjBL) is a suitable strategy for effectively integrating the STEAM approach in the context of its implementation in schools. PjBL gets students involved in designing, creating, and presenting solutions to real problems through a process of collaboration and exploration. Real-life problems prompt students to draw on their existing knowledge, build on initial discussions, and ultimately spark their curiosity about the situation (Mariani & Indriyanti, 2024; Permana et al., 2023). When students work on a project that is relevant to their world, they are encouraged to combine various knowledge and skills from different subjects. This combination of different disciplines ultimately leads to creativity in both the process and product of learning (Chistyakov et al., 2023). The production of biogas from organic waste is relevant to the STEAM approach and supports environmental education. This project incorporates science concepts, such as fermentation and anaerobic reactions (Kabeyi & Olanrewaju, 2022), as well as elements of technology (fermentation equipment), engineering (tool design), art (poster or tool design), and mathematics (volume, pressure, and proportion calculations). Additionally, the project introduces students to renewable energy and waste management issues, supporting contextualized, problem-based, and future-oriented learning (Susilawati et al., 2023).

STEAM-based biogas project assignments are designed to do more than provide students with conceptual knowledge. They also aim to nurture creative thinking skills such as generating original ideas, thinking flexibly, expanding and refining ideas, and expressing solutions visually (Niu & Cheng, 2022). Making biogas from household or school waste can effectively shape environmental awareness and increase student creativity. During the design process, students must design efficient tools, select appropriate materials, observe the fermentation process, and evaluate the effectiveness of their tools. Moreover, the practical nature of this project not only reinforces other character traits such as responsibility, perseverance, and collaboration, but is also highly accommodating to a variety of learning styles, ranging from visual, auditory, to kinesthetic (Novia Russilawatie & Anang Widodo, 2020; Talabudin Umkabu Sileuw, 2024). These activities encourage originality of ideas, flexibility of thinking, integration across disciplines, and visualization of solutions, all of which are important indicators of student creativity development. This is in line with the findings of Carter et al. (2021), who emphasized that STEAM projects engage students in iterative design thinking and foster innovative problem-solving (Carter et al., 2021). Wiarta (2021) demonstrated that STEAM-based learning significantly enhances higher-order thinking and creativity through project-based tasks (Wiarta, 2023). In addition, Hughes et al. (2022) found that the combination of science and art elements in STEAM encourages students to produce more original and aesthetically meaningful solutions during hands-on activities (Hughes et al., 2022). This study aims to identify how student involvement in STEAM-based biogas project assignments contributes to the creative development of seventh-grade students at MTs Negeri 06 Jember. The study will focus on direct observation of the project process, as well as analysis of student products and reports, in order to measure aspects of creativity that emerge during the learning process.

2. Literature Review

This literature review delineates the conceptual and theoretical foundations pertinent to the implementation of biogas projects in STEAM-based learning to cultivate student creativity. In order to comprehend the research framework in its entirety, this study concentrates on three primary variables.

A. STEAM-Based Learning

The STEAM approach represents an evolution of STEM (Science, Technology, Engineering, Mathematics) with the integration of Art. The inclusion of "Art" is pivotal, as it transcends mere aesthetics, encompassing the design process, humanities, and diverse forms of creativity that propel innovation. Experts regard "art" as a vital component. Georgette Yakman (2008) posits that it functions as the "glue" that binds the STEM disciplines together contextually (Yakman, 2008). Conversely, John Maeda (2012) contends that while STEM emphasizes the "how" of a given phenomenon, "art" interrogates the "why" of its relevance to humans, thereby promoting human-centered design solutions (Maeda, 2012).

The primary objective of STEAM learning is to integrate multiple disciplines into a cohesive instructional framework that mirrors the complexity of real-world problem-solving (Wised & Inthanon, 2024). First, STEAM emphasizes interdisciplinary fusion, in which traditional boundaries between subjects are intentionally blurred. This approach encourages students to draw simultaneously from various scientific and artistic perspectives when addressing complex problems, reflecting the multifaceted nature of contemporary challenges. Second, STEAM instruction is anchored in a real-world context, wherein learning materials are delivered through authentic, relevant projects or problems. This method has been shown to enhance student motivation and promote deeper conceptual understanding by situating learning within meaningful and relatable experiences. Third, skill development forms a fundamental component of the STEAM curriculum. While traditional STEM education effectively strengthens critical thinking through convergent analytical processes, the incorporation of the “A” (Arts) introduces opportunities for creativity, divergent thinking, design thinking, and innovation. This integration results in a more holistic learning experience that cultivates both analytical and creative competencies essential for navigating complex, interdisciplinary environments.

B. Creativity in Learning

Creativity in the context of education is defined as the ability to generate new, original, and valuable ideas. According to experts in the field, this ability is not an innate talent but rather a skill that can be cultivated and refined through deliberate practice. The cultivation of creativity is imperative to furnish students with flexible (out-of-the-box) and adaptive thinking skills. J.P. Guilford (1967) popularized the concept of divergent thinking (the ability to generate multiple ideas) as the core of creativity in his research, as opposed to convergent thinking (searching for one correct answer) (Rawlings et al., 2025). As posited by Teresa Amabile (1996) in Cremin and Chappell's (2021) research, the concept of creativity is contingent upon three factors: expertise, defined as domain skills; creative thinking processes; and, most crucially, intrinsic motivation, characterized by a genuine interest in the task at hand (Cremin & Chappell, 2021). Kaufman & Beghetto (2009) introduced the "Four C" model in the research by Dumas et al. (2024). According to this model, educational institutions must prioritize the cultivation of "Little-c" creativity (i.e., everyday creativity) and "Mini-c" creativity (i.e., new personal understanding) (Dumas & Kaufman, 2024). Conventional teacher-centered learning, characterized by a strong emphasis on evaluation through grades, has been demonstrated to diminish intrinsic motivation and creativity potentially. Conversely, an effective learning environment encourages exploration, provides autonomy, creates a "safe space" for students to take risks and fail, and values open-ended questions.

C. Biogas

Biogas is a methane-rich gas (CH_4) produced from the decomposition of organic material (e.g., waste) by microbes in anaerobic conditions (i.e., without oxygen) (Kumar, 2012). Its employment as a renewable energy source renders biogas a topic of significant pertinence for educational endeavors.

Anaerobic digestion (AD) is a complex biochemical process that proceeds through four interconnected stages (Kabeyi & Olanrewaju, 2022). The first stage, hydrolysis, involves the enzymatic breakdown of complex organic polymers such as carbohydrates, proteins, and lipids into simpler monomers, including sugars, amino acids, and fatty acids, which can be more readily utilized by microorganisms. This is followed by acidogenesis, during which these monomers undergo fermentation, resulting in the production of volatile fatty acids—most notably acetic acid—as well as alcohols and other intermediate metabolites. In the subsequent stage, acetogenesis, the volatile fatty acids and other intermediates are further metabolized by acetogenic bacteria into acetate, hydrogen, and carbon dioxide. The final stage, methanogenesis, is carried out by methanogenic archaea, which convert acetate, hydrogen, and carbon dioxide into biogas composed primarily of methane (CH_4) and carbon dioxide (CO_2). Collectively, these sequential stages form an integrated metabolic pathway that enables the efficient biological conversion of organic matter into renewable energy in the form of methane.

The efficacy of this process is contingent upon environmental factors, including temperature (mesophilic or thermophilic conditions), acidity level (pH), and the carbon-to-nitrogen (C/N) ratio of the raw material (e.g., waste) (Kasinath et al., 2021). Within the broader framework of STEAM education, biogas initiatives have proven to be particularly effective due to their strong interdisciplinary relevance and real-world applicability. First, these initiatives situate learning within an authentic context by addressing two critical global challenges—waste management and the ongoing energy crisis—thereby enabling students to engage with problems that are both scientifically significant and socially relevant. Furthermore, biogas projects inherently integrate multiple STEAM domains. They require the application of biological and chemical principles to understand the anaerobic digestion process, the incorporation of engineering concepts in designing and optimizing reactor systems, and the use of artistic elements to support design visualization and enhance communication of technical ideas. Mathematical competencies, such as conducting volumetric calculations and interpreting quantitative data, also play a central role throughout the learning process. In addition, participation in biogas-based experiential learning has been shown to foster key elements of character education, including environmental awareness, perseverance, and collaborative skills. Such activities also cater effectively to diverse learning styles, particularly benefiting students with strong kinesthetic tendencies by providing hands-on, inquiry-driven learning experiences. Collectively, these attributes underscore the pedagogical value of biogas initiatives as a robust and holistic STEAM learning model.

3. Method

This study belongs to descriptive qualitative. The subjects involved were 25 students of class VII D MTs Negeri 06 Jember, who participated in a two-week STEAM-based biogas project learning experience. Of these students, 10 were male and 15 were female. The students were divided into three heterogeneous groups, taking into account gender and academic ability, to encourage balanced and collaborative cooperation (Arib et al., 2024). The instruments used in this study include creativity observation sheets. The project results are documented in the form of photos, videos, and written reports. Creativity is indicated by several factors, including the originality of ideas, the flexibility of thinking, the integration across STEAM disciplines, visual expression, and perseverance in completing the project (Qomariyah & Subekti, 2021). The assessment is done using a four-level rubric, namely Very Good (4), Good (3), Fair (2), and Lack (1), with the criteria detailed in Table 1.

The assessment of the student worksheet was designed to evaluate students' conceptual understanding, project design competence, and capacity for reflection throughout the learning process. As presented in Table 2, the evaluation criteria are structured into three primary components, each assigned a specific weight to ensure a balanced appraisal of both cognitive and creative dimensions. The first component, Concept Understanding (40%), focuses on the accuracy and depth of students' responses related to biogas principles and the STEAM framework, emphasizing their ability to articulate fundamental scientific and interdisciplinary concepts. The second component, Project Design (40%), assesses the relevance and coherence of the proposed designs, including students' creativity in selecting materials and the logical organization of their workflow. This criterion highlights the extent to which students can translate theoretical knowledge into meaningful and feasible design solutions. The final component, Reflection and Conclusion (20%), evaluates students' ability to critically analyze their learning experiences, articulate challenges encountered during the project, and explain the solutions they developed. Collectively, these criteria provide a comprehensive measure of student performance by integrating conceptual mastery, design thinking skills, and reflective capacity.

Table 1. Creativity Observation Sheet Scoring Criteria

Creativity Indicator	Score			
	4 (Excellent)	**3 (Good)**	**2 (Simply)**	**1 (Less)**
Originality of Idea	Ideas are unique, unprecedented, and relevant	Ideas are sufficiently unique and relevant	Common and less differentiated ideas	Ideas are completely copied and less relevant
Flexibility of Thinking	Generate creative solutions to problems	Able to change strategy when facing obstacles	Solutions are limited and not varied enough	Does not show alternative solutions or stick to one failed method
STEAM Integration	Harmoniously combine 4-5 STEAM elements in the project	Incorporates 3 STEAM elements	Only 2 STEAM elements are used in a limited way	Less clear integration of STEAM elements
Visual Expression	Projects are displayed in a very attractive, aesthetically pleasing, and easy-to-understand manner.	Display is attractive and informative	The display is less attractive and somewhat confusing	Uncluttered, unesthetic, and difficult to understand display
Perseverance	Very active, consistently completing the project despite obstacles	Moderately active and stays involved in the project	Lack of consistency, often lose focus	Shows no engagement and gives up quickly

Table 2. Student Worksheet Scoring Criteria

Assessment Aspects	Score weight (%)	Description of the Assessment
Concept Understanding	40%	Accuracy in responses on biogas principles and STEAM
Project Design	40%	Relevance of the design, creativity in choosing materials, and logical workflow
Reflection and Conclusion	20%	Ability to analyze learning experiences, challenges faced, and developed solutions

Table 3. Final Score Classification of Student Worksheet

Score Range	Category
86 – 100	Excellent
76 – 85	Good
60 – 75	Fair
< 60	Needs Improvement

Table 4. Materials Used by Each Group in The Biogas Project

Group	Project Title	Materials Used	Additional Notes
1	Fruit Fermentation Biogas	Organic waste (rotten fruits), yeast, small jar, 600 ml plastic bottle, IV tube	Uses fermentation with yeast and a 600 ml bottle as the storage container for the produced gas.
2	Biogas for a Healthy Kitchen	Fruit and vegetable peels, rice washing water, 3-liter mini gallon, IV tube	Did not use a gas storage container
3	Dry Leaves Biogas	Dry waste (leaves), EM4, yeast, 600 ml plastic bottle, balloon, IV tube	Used EM4 and a balloon as the gas collector

Figure 1. Project Outcome of Group 1

Figure 2. Project Outcome of Group 2

Figure 3. Project Outcome of Group 3

The study was conducted over a two-week period through several systematically organized stages to support the achievement of the research objectives. The implementation of the biogas-based STEAM learning project was carried out over two weeks through a structured sequence of activities designed to promote inquiry, collaboration, and reflective learning. During the first week, the learning process began with an introduction to the fundamental concepts of biogas and the principles of the STEAM approach delivered by the teacher. Following this introductory session, students were organized into three collaborative groups to initiate project planning through guided discussions and the formulation of activity roadmaps. The subsequent phase, conducted on the third and fourth days, focused on idea exploration and project design. At this stage, students independently searched for relevant information and refined their design concepts through out-of-class learning conducted at home, thereby strengthening their autonomy and research skills.

The second week centered on the development and presentation of the students' biogas prototypes. On the fifth and sixth days, each group constructed a simple biogas prototype based on the designs developed in the previous week. These construction activities were conducted outside the classroom, with teachers providing real-time supervision and support through online Zoom sessions. On the seventh day, the groups presented their prototype outcomes in the classroom as part of the science lesson, and their work was assessed using creativity-based performance indicators. The implementation concluded on the eighth day with both individual and group reflections, during which students critically evaluated their learning experiences and the outcomes achieved. This reflective component served to reinforce metacognitive skills and deepen students' understanding of the interdisciplinary nature of the project.The teacher conducted brief interviews to explore students' perceptions of the project-based learning experience. All documentation and project data were collected and further analyzed as part of the research reporting process.

4. Result and Discussion

The results show that the biogas project-based learning using the STEAM approach over two weeks had a positive impact on the development of creativity among Grade VII students at MTs Negeri 06 Jember. During the two-week STEAM-based biogas project, all three student groups successfully developed biogas models using diverse materials and methods that reflected their creativity. The following table presents the materials used by each group in constructing their biogas prototypes.

Based on the table, each group used different types of organic waste materials from their surroundings, according to availability and their creativity. Group 1 chose to use rotten fruit waste mixed with yeast to accelerate fermentation (see Figure 1). They utilized a small jar and a 600 ml plastic bottle as the reaction container, along with an IV tube to channel the gas produced.

Group 2 used fruit and vegetable peels combined with rice washing water, which served as a natural fermentation medium (Figure 2). Although they used a 3-liter mini gallon as the main container, this group did not use a specific gas storage unit, indicating a simpler design approach. Figure 3 shows that Group 3 developed a model using dry waste in the form of leaves, enriched with EM4 and yeast, to speed up the decomposition of organic matter. A 600 ml plastic bottle served as the fermentation chamber, while a balloon was used to collect the biogas produced. The use of a balloon as a gas collector demonstrates the group's understanding of the importance of having a device to store and measure the volume of the produced gas. Below are images of each group's project outcomes.

A. Results of Group Creativity Observation

Creativity assessment based on five main indicators (originality of ideas, flexibility of thinking, integration of STEAM disciplines, visual expression, and perseverance) showed that all groups achieved ratings ranging from good to excellent. The following table summarizes the average creativity observation scores for each group, shown in Table 5. Groups 1 and 3 demonstrated high levels of creativity, particularly in the originality and STEAM integration applied in their projects. Group 2 also showed good creativity, although they had some limitations in the aspects of visual expression and perseverance, which were slightly lower compared to the other groups.

Table 5. Recapitulation of Student Creativity Observation Results by Group

No.	Originality of Ideas	Flexibility of Thinking	STEAM Integration	Visual Expression	Perseverance	Average Score	Category
1	4	4	4	3	4	3.8	Excellent
2	3	3	3	3	3	3.0	Good
3	4	4	4	4	4	4.0	Excellent

Table 6. Group-Wise Average Student Worksheet Scores

No.	Concept Understanding (40%)	Project Design (40%)	Reflection and Conclusion (20%)	Average Score (%)	Category
1	85	90	88	87.6	Excellent
2	80	80	87	82.3	Good
3	85	90	80	85	Good

B. Results of Group Student Worksheet Evaluation

The assessment of the Student Worksheet shows that, in general, students understood the concept of biogas, were able to design projects based on STEAM principles, and reflected well on the learning process. The following table presents the recap of average student worksheet scores by group, as in Table 6. Groups 1 and 3 achieved high scores, indicating strong understanding and good project design skills. Group 2 received slightly lower scores, particularly in the aspect of project design; however, the score still falls within the fair category, suggesting there is room for improvement.

C. Discussion

The results of this study indicate that the biogas project-based STEAM learning was effective in enhancing the creativity of Grade VII students at MTs Negeri 06 Jember. This is evidenced by the average group creativity observation scores, which fell within the "good" to "excellent" categories, as well as the student worksheet scores that reflect students' conceptual understanding and project design abilities.

The STEAM approach, an acronym for Science, Technology, Engineering, Arts, and Mathematics, prompts students to proactively participate in the resolution of authentic problems using interdisciplinary thinking (Belbase et al., 2022). In this project, students not only understood the concepts of fermentation and renewable energy but also designed tools, tested prototypes, compiled reports, and visualized their ideas in the form of tangible projects. This aligns with findings that suggest STEAM enables holistic learning by combining elements of art and science to enhance creativity and conceptual understanding (Shukurova, 2025). Other studies confirm that the STEAM approach encourages students to analyze actively. It also encourages students to collaborate. The STEAM approach encourages students to evaluate. In addition, it encourages students to solve problems (Rahmawati et al., 2022). This process provides students with the opportunity to integrate prior knowledge with newly acquired information. They can then use this to solve problems (Chistyakov et al., 2023).

In line with the present findings Wastiani et al. (2023) reported that STEAM-based learning improves students' creative expression by fostering innovation during the project implementation stages (Wastiani et al., 2023). Likewise, research by Zayyinah et al (2022) revealed that students involved in STEAM-integrated activities demonstrate significant improvement in generating original ideas and expressing them through various media (Zayyinah et al., 2022). Furthermore, Wahba et al (2022) highlighted that STEAM encourages metacognitive awareness, enabling learners to reflect on their learning and continuously refine their ideas (Wahba et al., 2022). These findings strengthen the view that STEAM-based project assignments, such as the biogas project, can develop students' higher-order thinking competencies in a measurable and meaningful way.

Furthermore, the process of designing and testing the biogas model provided students with opportunities to develop both technical and scientific creativity. For example, the group that used a balloon as a gas container demonstrated critical thinking in adapting the tool's design to suit the experiment's objectives. This is supported by Indahwati et al., who stated that the STEAM approach is effective in fostering higher-order thinking skills, especially in the context of project-based learning (Indahwati et al., 2023). The STEAM approach encourages children's creativity and improves their ability to solve problems and interact with the environment (Habibi, 2023).

One of the strengths of this approach is the freedom it gives students to experiment. Students were able to choose available organic waste materials from their surroundings, design simple systems, and determine methods for testing biogas based on their understanding. This variation demonstrates that students possessed flexibility in thinking, which is a key indicator of creativity (Ozkan & Umdu Topsakal, 2021). These findings are consistent with studies concluding that project-based learning can enhance creative thinking and problem-solving skills, as it encourages students to develop solutions to real-world problems (Shukurova, 2025). Other studies have also found that hands-on STEAM activities have a positive effect on students' creativity, enabling them to develop diverse ways of thinking during the process of designing and producing final products, which in turn enhances their product innovation and problem-solving solutions (Hsiao et al., 2022).

On the other hand, although the overall results were positive, differences were still observed in the levels of perseverance and visual expression among the groups. The group that received lower scores tended to be less meticulous in assembling their tools and writing their reports, and less innovative in visualizing their designs. This highlights an important consideration: the success of STEAM learning depends not only on conceptual understanding but also on fostering students' scientific attitudes and collaborative skills. As previously noted, STEAM education should be integrated with character development (Widarwati et al., 2021). The four STEAM programs taught both discipline-specific and beyond-discipline character-building skills. The abilities imparted encompass critical thinking and problem solving; teamwork and interaction, and ingenuity and originality (Bertrand & Namukasa, 2020).

In terms of assessment instruments, the use of observation rubrics and student worksheets enabled teachers to objectively evaluate both the learning process and the final products. This assessment covered cognitive, affective, and psychomotor dimensions, which are essential for evaluating project-based learning. This aligns with the idea that a comprehensive assessment approach is necessary in 21st-century skills-based education (Muttaqiin, 2023). Overall, the results of this study support the use of the STEAM approach in local and simple contexts, such as utilizing organic waste for alternative energy. This not only strengthens students' understanding of science concepts but also fosters environmental awareness, collaboration skills, and innovative abilities, all of which are highly relevant to the goals of education in the era of the Merdeka Curriculum.

5. Conclusion

This study proves that biogas project-based learning with the STEAM approach has a positive influence on the development of creativity of seventh-grade students at MTs Negeri 06 Jember. During the two-week implementation, all student groups successfully designed and built biogas prototypes with a variety of organic materials from the surrounding environment. Observation results showed that students were able to display original ideas, flexibility of thinking, integration across disciplines, and good perseverance in completing the project. Assessment of the student worksheet also indicated a strong understanding of the biogas concept, the ability to design projects according to STEAM principles, and sound reflection on the learning process.

These results are in line with previous findings that the STEAM approach is effective in encouraging critical, collaborative, and creative thinking and problem solving. Through freedom of experimentation and self-design, students not only develop technical and scientific creativity but also demonstrate environmental awareness and responsibility for their work. Though there were differences in visual expression and perseverance among the groups, the STEAM project-based learning holistically fostered 21st century competencies. This approach is relevant to be applied in the context of science learning at the junior high school level. It is especially relevant in supporting the implementation of the Merdeka Curriculum.

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