International Journal of Social Science and Human Research

ISSN (print): 2644-0679, ISSN (online): 2644-0695

Volume 08 Issue 10 October 2025

DOI: 10.47191/ijsshr/v8-i10-62, Impact factor- 8.007

Page No: 8060-8067

Study on Applying the Characteristic Process of Realistic Mathematics Education Theory in Teaching and Learning Geometry and Measurement - Grade 5

Huong Le Thi Thu[1], Hanh Le Thi[2]

[1]Thai Nguyen University of Education, Faculty of Primary Education, Vietnam

[2]Nam Tien Primary School, Ninh Binh Province, Vietnam

ABSTRACT: The theory of Realistic Mathematics Education (RME) is not merely a specific instructional method but rather a comprehensive educational perspective. It is founded upon profound insights into the nature of mathematics, the ways in which mathematics is learned, the role of reality in the process of knowledge construction, and a coherent system of characteristic pedagogical principles. From the viewpoint of RME, the Grade 5 mathematics curriculum holds significant potential for organizing learning activities that promote active student engagement through meaningful, context-based situations aligned with learners' real-life experiences. This study proposes a teaching process grounded in the principles of Realistic Mathematics Education for Geometry and Measurement in Grade 5. The proposed process is developed based on an analysis of its pedagogical purposes and scientific underpinnings. Furthermore, the study illustrates this process through a sample learning activity designed to help students discover the formulas for calculating the lateral surface area and total surface area of a rectangular prism, as presented in the Vietnamese Grade 5 mathematics curriculum.

KEYWORDS- RME, Geometry and Meassurement, grade 5, Vietnam, Maths

I. INTRODUCTION

The perspective of Realistic Mathematics Education (RME) is fully consistent with the orientation of Vietnam's 2018 General Education Curriculum, particularly the primary mathematics curriculum, which emphasizes that: "Mathematics should be taught in close connection with real-life contexts. Students should be guided to explore and construct new knowledge through experiential activities, problem-solving, modeling, and mathematical communication. Instruction must promote activeness, autonomy, and creativity, aiming to develop students' mathematical competence and essential personal qualities." (Ministry of Education and Training, 2018, p.5). The theory of Realistic Mathematics Education (RME) was initiated by Hans Freudenthal in the Netherlands during the 1970s. It is grounded in the belief that mathematics is a human activity, created as a means to solve real-world problems. Accordingly, mathematics is not merely a system of abstract knowledge to be absorbed, but a process in which learners actively engage, experience, and construct understanding (Freudenthal, 1991). Freudenthal emphasized that mathematics learning should begin with problems arising from real-life situations or from "imaginable" contexts that are meaningful to learners. From such contexts, students gradually construct mathematical knowledge through a process known as guided reinvention, in which the teacher acts as an organizer, facilitator, and guide, helping students to explore, generalize, and apply new concepts (Freudenthal, 1991). RME is not a single instructional method but rather a comprehensive educational theory, integrating perspectives on the nature of mathematics, how mathematics is learned, and how teaching and learning should be organized.

According to Treffers (1987), the three core characteristics of RME include: (1) Learning begins from realistic contexts or situations; The learning process involves guided reinvention under the teacher's orientation; and (2) Emphasis is placed on collaboration and interaction among learners.

Within this framework, mathematics is not viewed as an absolute, pre-existing body of knowledge but as a human construct developed to model and solve problems arising from daily life. Freudenthal (1991) asserted that mathematics should be understood as an activity, not as a collection of finalized results. Consequently, mathematics is dynamic—constantly evolving through processes of exploration, restructuring, and human creativity situated within specific social and cultural contexts. This approach highlights the active role of learners in constructing mathematical understanding and opens up opportunities to develop mathematical thinking from learners' own life experiences, rather than approaching mathematics as a dry, abstract system of concepts.

II. CONTENT

A. The Purpose of Applying the Characteristic Process of Realistic Mathematics Education in Teaching Geometry and Measurement in Grade 5

The purpose of this approach is to organize the teaching and learning process in mathematics in general, and in Geometry and Measurement at the Grade 5 level in particular, according to the characteristic instructional process of Realistic Mathematics Education (RME), rather than following a traditional, linear teaching model. By initiating lessons through real-life situations and facilitating students' discovery of new knowledge through modeling and guided reinvention, learners are not only motivated to engage with the lesson content but also actively participate in the construction of mathematical knowledge in a natural, context-based manner. This approach aims to foster the comprehensive development of students' mathematical competence, in alignment with the orientation of Vietnam's 2018 General Education Curriculum, which emphasizes the cultivation of both key competencies and personal qualities.

B. The Scientific Basis for Applying the Characteristic Process of Realistic Mathematics Education in Teaching Geometry and Measurement in Grade 5

The theory of Realistic Mathematics Education (RME), initiated by Hans Freudenthal (1991), asserts that mathematics should not be taught as a purely abstract system of concepts detached from reality. Instead, it should be discovered and "reinvented" by students through meaningful, context-based situations connected to everyday life. Accordingly, students learn mathematics by doing mathematics—that is, by engaging in exploration, reasoning, and problem-solving rather than passively receiving knowledge.

The entire teaching–learning process in RME is organized into a five-step pedagogical progression, in which each phase is distinct yet closely interconnected:

(1) Starting from a real-life situation
(2) Initial modeling (horizontal mathematization)
(3) Guided reinvention (vertical mathematization)
(4) Generalization and formalization of knowledge
(5) Application in new situations

This progression not only reflects the methodological characteristics of the RME theory but also creates conditions for students to actively construct mathematical knowledge, while fostering natural and deep mathematical thinkingthrough participation in meaningful learning activities.

C. Implementation Procedure

According to the theory of Realistic Mathematics Education (RME), the teaching and learning process is organized into consecutive and organically connected stages, including the following:

(1) Starting from a Real-Life Situation

The introductory stage plays a particularly crucial role in the RME-based instructional process, as it serves to generate students' intrinsic motivation to engage with the lesson through a meaningful, context-based situation closely related to their everyday lives. The objective of this stage is not to illustrate pre-existing knowledge but rather to stimulate a need to learn mathematics, create a cognitive gap, and guide students toward engaging in the process of mathematization.

To implement this stage effectively, the teacher must clearly identify the core content of the lesson and, from there, select or design a realistic situation that is appropriate and relevant. Such situations may arise directly from students' daily experiences, their school environment, or be imaginable but relatable hypothetical contexts—that is, situations that possess practical and cognitive realism even if they do not occur literally in real life. What is essential is that the context must contain potential mathematical elements and evoke students' curiosity and desire to explore. The real-life situations may come from: School-related contexts: measuring the length of the classroom blackboard, calculating the area of the schoolyard, the perimeter of a flower bed, or the area of the classroom floor; Household activities: measuring the size of a study desk, the height of a bookshelf, or the dimensions of a box, a birthday gift, or a bedroom; Games or experiential activities: assembling geometric solids, constructing models with paper or cardboard,...

These contexts can be presented in various forms, such as illustrative images, real objects, short narratives, videos, or mathematical games. After introducing the situation, the teacher should employ open-ended guiding questions to encourage students to observe, make predictions, express initial ideas, or pose questions of their own. This interaction helps to generate students' interest and a genuine need to explore the mathematical aspects embedded within the situation.

Importantly, after this introductory stage, the teacher must smoothly guide students to the next phase—modeling—ensuring a natural and coherent transition that preserves the pedagogical flow and effectiveness of the learning process.

(2) Initial Modeling

After students have engaged with the real-life situation and developed a sense of curiosity in the introductory phase, the teacher leads them into the stage of initial modeling, which marks a critical transition from real-world experience to mathematical thinking.

In this stage, students begin to analyze the situation by identifying the core mathematical components embedded in the real-world context. These include: Data (known information such as measurements, shapes, objects, or given rules); Goals (what needs to be found or solved, e.g., area, perimeter, or volume); and Means (tools or resources available to them, such as rulers, pencils, models, learning aids, or digital tools).

Students are encouraged to represent their understanding of the mathematical situation using visual and concrete forms. Common modeling activities in this phase include drawing diagrams or sketches of relevant elements, measuring real objects with simple tools, estimating dimensions or quantities, creating data tables for comparison, or even constructing simple physical or digital models.

This process represents horizontal mathematization, meaning that students move from a realistic context to a learning model that bridges the everyday world and the abstract mathematical world. Although formal mathematical knowledge has not yet been established at this stage, the foundation for reasoning, calculation, and logical thinking begins to take shape through direct manipulation and concrete representation.

The main objective of the initial modeling stage is to provide opportunities for students to actively explore the relationships between real-life objects and emerging mathematical concepts. Through this process, students gradually develop skills in observation, situation analysis, spatial–visual reasoning, and the ability to express ideas concretely, logically, and with justification.

(3) Guided Reinvention

Once students have completed the modeling of real-life situations in the previous stage, the teacher continues by organizing activities that guide students toward the discovery and formulation of new mathematical knowledge. This stage represents vertical mathematization—the process in which learners move from concrete learning models(drawings, measurements, real objects, or tables) to abstract mathematical concepts, rules, and formulas.

In the guided reinvention stage, the teacher does not directly transmit knowledge but rather acts as a facilitator and guide, supporting students in their self-construction of knowledge. Instead of explicit explanation, the teacher designs open-ended questions, debates, and exploratory tasks that promote students' participation in discovery and reasoning. Through these interactions, students are guided to identify mathematical relationships by observing models, comparing results among groups, experimenting with different solution approaches, and gradually recognizing patterns that lead to conceptual generalization.

Typically, students begin this process by testing several specific cases to detect repetition or hidden regularities. Collaborative group discussions play an essential role, enabling students to explain results, articulate ideas, critique one another's hypotheses, and strengthen both their communication and mathematical reasoning skills. Students employ informal mathematical language to describe their reasoning, which is gradually refined and formalized under the teacher's guidance.

Finally, the teacher supports students in formulating rules, formulas, or definitions in an accurate and systematic manner. The process of guided reinvention not only fosters a deep understanding of mathematical concepts, but also develops logical reasoning, generalization, and problem-solving skills. Moreover, when students independently discover and construct knowledge, they experience a sense of achievement and ownership, which enhances motivation, confidence, and meaningful engagement in learning.

(4) Generalization and Formalization of Knowledge

After students have participated in the guided reinvention process and initially identified mathematical rules or relationships derived from concrete learning models, the next phase in the RME instructional sequence is generalization and formalization of knowledge. This stage serves a crucial function in the RME process—it marks the transition from individually constructed knowledge to formal mathematical knowledge recognized by the academic community. The aim is not only to consolidate understanding but also to ensure that students' knowledge is standardized, precise, and systematically structured.

In essence, this phase connects students' fragmented discoveries into a coherent and integrated system of knowledge, helping them avoid misconceptions or rote memorization of formulas. It also facilitates the transformation of informal mathematical language—developed during the modeling and reinvention stages—into the formal, disciplinary language of mathematics. Consequently, students acquire knowledge in a logical manner while strengthening their capacity for abstraction, generalization, and mathematical communication.

During this stage, the teacher's role is to guide and formalize students' understanding. The teacher synthesizes students' earlier expressions of knowledge, identifies imprecise statements, and then refines and formalizes them using accurate mathematical terminology. The use of visual aids such as charts, tables, and diagrams is also encouraged to help students consolidate understanding and connect new ideas with prior knowledge.

Student activities during this stage include: participating in group discussions to standardize definitions and rules; comparing group findings with the teacher's formal presentation; re-expressing new concepts using learned models or diagrams; and systematizing their discovery process to derive general solution methods for similar problem types. These activities contribute to the development of communication, logical reasoning, and modeling competencies—key components of mathematical thinking.

Thus, the stage of generalization and formalization does not merely conclude the process of knowledge acquisition but also signifies a transition from "doing mathematics" to "learning mathematics" in a formal, scientific, and enduring manner.

(5) Application in New Situations

After students have constructed, generalized, and formalized new knowledge, the final stage in the instructional process of Realistic Mathematics Education (RME) is applying the acquired knowledge in new situations. This is a pivotal phase that both concludes the learning cycle and opens opportunities for students to consolidate, master, and extend their understanding. It also develops their ability to apply mathematics to real-world contexts—one of the core competenciesemphasized in Vietnam's *2018 General Education Curriculum*.

The application stage serves as the concluding yet crucial component of the RME teaching process. It functions to reinforce and validate the outcomes of knowledge acquisition while encouraging learners to apply their understanding to solve new problems across diverse real-life contexts. The aim of this stage is to help students practice flexible reasoning, knowledge transfer, and develop independent and creative learning skills.

During this stage, teachers can organize a variety of activities. A common approach is to assign realistic problem-solving tasks that are similar to previously encountered ones but include changes in data, requirements, or contexts. Such variation encourages students to adapt, refine, and flexibly apply their understanding.

In addition, students are encouraged to design their own new situations or create inverse problems related to their personal experiences. These activities not only foster creativity but also strengthen students' awareness of the connection between mathematics and real life—a defining feature of the RME approach.

To enhance mathematical communication, teachers may ask students to present their solutions, explain their reasoning, justify their chosen strategies, or share results with peers. Group discussions and peer critique deepen understanding, improve argumentation skills, and cultivate critical thinking.

Furthermore, this stage provides opportunities for knowledge expansion through interdisciplinary integration, connecting mathematics with other subjects or with activities beyond the classroom. Such cross-disciplinary learningpromotes systems thinking and equips students to solve complex, real-world problems effectively.

The significance of applying knowledge in new situations lies not merely in reproducing what has been learned, but in demonstrating a genuine transformation from "learning to know" to "learning to do." This stage embodies the success of the RME learning process, as students not only comprehend and retain mathematical concepts but also apply them meaningfully and effectively to real-life contexts—an essential criterion of modern education.

D. Some Pedagogical Considerations in Implementing the Approach

To effectively implement the teaching of Geometry and Measurement in Grade 5 according to the characteristic instructional process of Realistic Mathematics Education (RME), several interrelated conditions must be met as follows:

1. Teachers' Competence

Teachers need to be professionally trained in the RME framework and possess a clear understanding of its characteristic instructional sequence—starting from real-life situations, modeling, guided reinvention, generalization, and application.
In addition, teachers should develop the ability to observe and analyze students' learning processes, identify emerging signs of mathematization, and provide timely support. It is essential that teachers avoid premature intervention, which may shorten or formalize the discovery process, thereby reducing its educational value.

2. Availability of Diverse and Appropriate Learning Materials

A key prerequisite for the effective implementation of RME-based teaching lies in ensuring that learning materials are contextually rich, varied, and relevant. Real-life situations should be carefully designed to align with the lesson content and connect to students' everyday experiences. These contexts serve as the crucial entry point that motivates and guides students into exploration and mathematization.

Furthermore, the use of visual and hands-on teaching aids—such as pictures, real objects, geometric models, data tables, and diagrams—along with digital tools like *GeoGebra*, *Cabri Geometry*, or AR/VR applications, can significantly enhance students' ability to manipulate, visualize, and model mathematical ideas in an engaging and dynamic manner.

3. Ensuring Student Interaction and Collaboration

Classroom organization should promote interaction and collaborative learning. Teachers need to create a positive, student-centered learning environment that encourages learners to express individual ideas, listen to peers, and engage in open dialogue and cooperation.

The classroom space should be flexibly arranged to facilitate transitions between individual, pair, and group work, as well as between paper-based and hands-on modeling activities. Such flexibility enhances participation, communication, and collective problem-solving—key components of effective RME implementation.

E. An Illustrative Example of Implementation

Lesson 28 – Lateral Surface Area and Total Surface Area of a Rectangular Prism, *Mathematics Textbook for Grade 5*, *Series: "Connecting Knowledge with Life*", Volume 2, Vietnam Education Publishing House, 2022, pp. 70–71.

Objectives

1. Knowledge Objectives

Students understand how to calculate the lateral surface area and total surface area of a rectangular prism through an exploratory learning process derived from a real-life context.

Students discover and comprehend the meaning of the formula for calculating the lateral surface area:

$S_L = (a + b) \times 2 \times h$

$S_T = (a + b) \times 2 \times h + a \times b \times 2$

Students are able to apply the learned formulas to solve real-world problems involving the calculation of the surface area covering objects shaped as rectangular prisms.

2. Mathematical Competency Objectives

Mathematical Modeling Competence: Students are able to construct mathematical models from real-life contexts (such as wrapping a gift, labeling a box, or painting a wall). This includes measuring dimensions, sketching the faces of a rectangular prism, and translating practical operations into mathematical representations.

Problem-Solving Competence: Students are able to analyze task requirements, identify the necessary data, select appropriate formulas, and perform accurate calculations to obtain correct and meaningful solutions.

Mathematical Reasoning and Thinking Competence:Students are able to analyze the relationships between the dimensions of a rectangular prism and its surface areas, identify mathematical patterns, and generalize them into formal formulas.

Mathematical Communication Competence: Students participate actively in group discussions, present their reasoning and problem-solving processes clearly and logically, and are able to listen, respond, and defend their mathematical ideas with evidence and justification.

3. Affective and Personal Qualities to Be Developed

Responsibility: Students demonstrate cooperative learning behavior in group activities and complete assigned tasks responsibly.

Diligence and Honesty: Students perform measurements, recordings, and calculations accurately, and report results truthfully and independently.

Practical Thinking: Students are able to connect learned knowledge to real-life contexts such as gift wrapping, labeling packages, tiling, or wall painting.

Although Lesson 28 in the *Mathematics Textbook for Grade 5 – Connecting Knowledge with Life* is titled *"Lateral Surface Area and Total Surface Area of a Rectangular Prism,"* the illustrative example presented in this paper focuses solely on the teaching process related to the lateral surface area. This choice is made because the lateral surface area is the core content introduced first in the lesson and serves as a clear representation of each phase in the instructional sequence of the Realistic Mathematics Education (RME) approach.

Limiting the analysis to this portion does not diminish the integrity of the overall lesson; rather, it allows for a deeper and more precise illustration of how the RME theory can be applied to teach a specific mathematical concept in the Grade 5 curriculum. The content on total surface area, typically introduced in a subsequent lesson, can likewise be organized following a similar process, based on the same pedagogical principles elucidated in this example.

(2) Initial Modeling (Horizontal Mathematization)

After students have understood the real-life problem presented in Step 1 (wrapping a rectangular gift box), the teacher guides them into the stage of initial modeling through specific learning activities.

Activity 1: Observation and Measurement

The teacher divides the class into small groups, each provided with a real rectangular gift box (or a cardboard model of a rectangular prism). Students use rulers to measure the length (a), width (b), and height (h) of the box. Each group records its measurements in a group data table, ensuring accuracy and clarity.

Activity 2: Representing the Situation through Modeling

Students draw diagrams of the box's faces on paper or group boards, identifying the six faces: four lateral faces, and two top–bottom faces.

From these diagrams, students calculate the area of each face using the formula for the area of a rectangle.

The teacher poses the guiding question:

"If we only wrap the sides of the box (not the top and bottom), which faces do we need to include in our calculation?" This prompts students to reason about the concept of lateral surface area.

The objective of this stage is for students to represent the real-life situation in a mathematical model. Through using measurements, drawings, and data tables, students develop mathematical modeling competence by expressing relationships between geometric dimensions and surface areas. This concrete and visual activity provides a solid foundation for the abstraction and generalization processes in the following step.

For example, suppose one group measures a box with the following dimensions: length = 12 cm, width = 8 cm, height = 10 cm. Students then sketch four lateral faces: two faces measuring 12 cm × 10 cm and two faces measuring 8 cm × 10 cm. The top and bottom faces each measure 12 cm × 8 cm.

Students calculate the area of each face as follows:

$12 \times 10 = 120\ \text{cm}^2$ (each of the two larger lateral faces) → $2 \times 120 = 240\ \text{cm}^2$

$8 \times 10 = 80\ \text{cm}^2$ (each of the two smaller lateral faces) → $2 \times 80 = 160\ \text{cm}^2$

Hence, the total lateral surface area is: $240 + 160 = 400\ \text{cm}^2$.

(3) Guided Reinvention (Vertical Mathematization)

After students have modeled the real-life situation through drawings, data tables, and individual face area calculations, the teacher organizes guided exploratory activities to help students derive the formula for the lateral surface area in a natural and conceptually grounded way, based on their own experiences. Specifically:

Activity 1: Organizing Exploratory Activities

The teacher asks each group to present the results of their modeling work from Step 2.

Lateral surface areas: $12 \times 10 \times 2 + 8 \times 10 \times 2 = 400\ \text{cm}^2$

Activity 2: Teacher's Guidance – Students' Discovery of the Rule

The teacher poses guiding questions to lead students toward recognizing patterns and generalizing relationships:

Which faces make up the lateral part of the box?

Is there a way to calculate the total area of the lateral faces without adding each face individually?

$$12 \times 10 \times 2 + 8 \times 10 \times 2 = (12 + 8) \times 10 \times 2$$

What does the sum of the length and width represent? Does it relate to the perimeter of the base?

Through group discussion, students realize that:

"The total area of the four lateral faces equals the perimeter of the base multiplied by the height."

The teacher helps students verbalize and formalize their discovery into the mathematical formula:

$$S_L = (a + b) \times 2 \times h$$

Where a = length, b = width, h = height of the rectangular prism.

Activity 3: Verification through Comparison and Adjustment

The teacher then asks students to apply the discovered formula to verify their initial calculation:

$$S_L = (a + b) \times 2 \times h = (12 + 8) \times 2 \times 10 = 400\ \text{cm}^2$$

The result matches the value obtained by summing the areas of individual faces.

At this stage, students construct new mathematical knowledge through action, discussion, and reasoning, rather than passively receiving it. This process of vertical mathematization enables students to develop generalized reasoning and to connect spatial geometry with prior knowledge of perimeter and area of rectangles. This serves as a clear demonstration of the RME principle of "guided reinvention," whereby students rediscover mathematical concepts through structured, teacher-supported exploration.

(4) Generalization and Formalization of Knowledge

After students have discovered the formula for calculating the lateral surface area of a rectangular prism through experiential activities, measurement, modeling, and reasoning in the previous steps, the teacher proceeds to the stage of generalization and formalization of knowledge. This stage plays a crucial role in standardizing mathematical understanding and reinforcing students' competencies through the following activities:

Activity 1: Standardizing Language and Notation

The teacher asks students to verbally restate the rule they have discovered:

"To find the lateral surface area of a rectangular prism, we multiply the perimeter of the base by the height."

The teacher then guides students to write the formula:

$$S_L = (a + b) \times 2 \times h$$

where: a = length of the box, b = width of the box, h = height of the box.

Students read the formula aloud and compare it with their results from Step 3 to verify accuracy and consistency.

Activity 2: Connecting New Knowledge with Prior Knowledge

The teacher helps students make connections between new and previously learned content by emphasizing that:

$$(a + b) \times 2$$

is exactly the perimeter of a rectangle—a concept they studied in Grade 3.

Multiplying the perimeter of the base by the height corresponds to "unfolding" the rectangular prism into four lateral rectangular faces, thus establishing a visual and conceptual link between solid geometry and plane geometry. This activity helps students realize that new mathematical knowledge is not isolated but rather an extension and deepening of what they have already learned, thereby fostering a coherent and cumulative understanding of mathematics.

Activity 3: Visualization and Generalization through Diagrams

The teacher uses a real gift-box model or a video demonstration showing how a rectangular prism can be unfolded into flat surfaces: two faces representing *length × height* and two faces representing *width × height*.

Students observe and confirm that: $2 \times (\text{length} \times \text{height}) + 2 \times (\text{width} \times \text{height}) = (\text{perimeter of the base}) \times (\text{height})$

This activity serves as a visual representation of the formula, helping students to internalize and consolidate the connection between geometry and algebraic expressions.

Activity 4: Recording and Formalizing Knowledge

The teacher asks students to record the key concept in their notebooks (as stated in the textbook, p. 86): "The lateral surface area of a rectangular prism equals the perimeter of its base multiplied by its height."

Hence, the formula:

$$S_L = (a + b) \times 2 \times h$$

Through this process, students not only memorize but also deeply understand the conceptual meaning of the formula via real-world experiences and learning models. Knowledge at this stage becomes formally recognized and standardized in the form of a formula and definition. This ensures scientific accuracy while reinforcing students' confidence and trust in their own learning process.

(5) Application in New Situations

After students have discovered and mastered the formula for calculating the lateral surface area of a rectangular prism, the teacher organizes activities that allow them to apply the knowledge in new or extended contexts, with the aim of developing their ability to use mathematics in real-life situations. This phase not only reinforces students' understanding but also provides opportunities for knowledge transfer, enabling learners to demonstrate independent and creative mathematical thinking.

The teacher may employ several instructional formats as follows:

Students solve problems with contexts related to the lesson but with different numbers, conditions, or purposes, encouraging flexibility in application.

Extended Situations:

Tasks are designed to connect mathematics to everyday life or outdoor activities, allowing students to experience the relevance of mathematical learning.

Self-Designed Situations:

Students are invited to create their own realistic scenarios and apply the learned formula to solve problems within those contexts.

Mathematical Communication Activities:

Students explain the learned concept to peers, justify their chosen methods, or critique and evaluate other groups' solutions.

Examples:

Problem 1: A gift shop wants to wrap a rectangular gift box with dimensions 14 cm × 10 cm × 8 cm. Calculate the area of colored paper needed to wrap the lateral surfaces of this box.

Problem 2: This month, your class is preparing six identical gift boxes for a group birthday celebration. Each box has dimensions 12 cm × 9 cm × 6 cm. How many square centimeters of colored paper are needed to cover the lateral surfaces of all six boxes?

Problem 3: During the summer break, Lan plans to redecorate her room by applying wallpaper to the walls surrounding the room. Her room measures 3 m wide, 4 m long, and 3 m high, and the combined area of one window and one door is 3 m^2. Determine the minimum area of wallpaper (in m^2) needed to cover all the walls surrounding the room.

Creative Task: Think of a real-life situation at home or at school in which you can apply the formula for the lateral surface area of a rectangular prism. Describe the situation clearly and explain how you would solve the problem.

III. CONCLUSIONS

In Realistic Mathematics Education (RME), reality occupies a central position—both as the starting point and as the continuous point of reference throughout the process of learning mathematics. According to Freudenthal (1991), students should learn mathematics *"from reality"* and *"for reality"*. Incorporating real-life situations into mathematics instruction enables students to perceive the meaning and relevance of mathematical content, thereby enhancing their interest, motivation, and ability to apply knowledge in authentic contexts. The strand of Geometry and Measurement, which is inherently and closely connected to daily life, offers the greatest potential for designing learning activities oriented toward the mathematization of real-world situations. A thorough analysis of the Grade 5 mathematics curriculum, particularly its geometry and measurement components, thus provides a critical foundation for proposing and implementing RME-based instructional approaches that effectively develop students' mathematical competencies. The application of the characteristic instructional process of RME represents just one of several pedagogical strategies that teachers can employ when teaching the Geometry and Measurement strand in Grade 5. Naturally, this process can also be adapted for other content strands and grade levels. However, continued research to identify and develop additional pathways and methods for integrating RME principles into mathematics teaching remains highly necessary—and constitutes an open and promising direction for further study.

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