



# Implementation of Differentiated Learning in Science Subject in Grade V of SD Negeri 03 Geragahan

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**Abstract:** The diversity of student characteristics is a challenge for educators in the learning process. Therefore, the ability of teachers to accommodate these differences is a key factor in creating effective and meaningful learning. Differentiated learning has emerged as an adaptive and meaningful approach. Differentiated learning has emerged as an adaptive approach designed to optimally meet students' learning needs. This study aims to describe the implementation of differentiated learning in science subjects in class V of SD Negeri 03 Garagarhan, focusing on three main aspects, namely planning, implementation, and learning assessment. This research uses a qualitative approach with descriptive methods. Data were collected through interviews, observations, and documentation with instruments in the form of interview guidelines, observation guides, and documentation. Data analysis techniques were carried out through the stages of data reduction, data presentation, and drawing conclusions. The implementation of differentiated learning in science subjects in class V of SD Negeri 03 Geragahan has been carried out in a structured and collaborative manner. Planning involves teachers, principals, and parents by considering the learning needs of students from academic and socio-cultural aspects. The implementation begins with a diagnostic assessment and is outlined in a teaching module that adjusts the learning method, media, and environment. Assessment is carried out in a sustainable and adaptive manner. However, this process still faces obstacles such as time constraints, as well as the potential for social jealousy between students. Nevertheless, the school still shows a commitment to realizing inclusive and student-centered learning.

**Keywords:** Differentiation; Implementation; IPAS

## Introduction

The curriculum has a strategic role in the education system as a guide for teachers to create meaningful learning (Mujib et al., 2025; Retnaningrum et al., 2023). The transformation of education in Indonesia is marked by the presence of the Independent Curriculum, which gives freedom to students to develop their potential, interests, and talents in accordance with their nature and times (Al-Akmam & Pahmi, 2024; Dirgantoro & Soesanto, 2023). The curriculum emphasizes flexibility, differentiation, and student-centered learning so that students can understand concepts in depth and improve their competencies (Fadil et al., 2023).

One of the innovations of the Independent Curriculum is the merger of Natural Sciences (IPA) and Social Sciences (IPS) subjects into Natural and Social Sciences (IPAS) at the elementary school level. This integration aims to provide a holistic understanding of the natural and social environment, while strengthening multicultural education (Andreani & Gunansyah, 2023; Kemendikbud, 2022). However, research shows that the implementation of IPAS still faces challenges, especially in content integration and the adjustment of learning approaches (Mutia & Admawati, 2024).

The diversity of student readiness, interests, and learning styles is a challenge for teachers in implementing the Independent Curriculum effectively. Based on Government Regulation No. 57 of 2021 and

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Permendikbud No. 22 of 2021, the learning process must be student-centered and foster creativity and independence. In this context, differentiated learning emerges as an innovative solution to tailor learning processes, content, and products to the individual needs of students (Fitriyana et al., 2024; Purnawanto, 2023; Ristiyati et al., 2023; Zulaiha, 2025).

Although the concept of differentiated learning has long been known, its implementation in elementary schools is still limited due to limitations in teachers' understanding and skills. Recent research confirms that differentiated learning is effective in increasing student motivation, engagement, and learning outcomes, but many teachers have not been able to implement it optimally without adequate professional support (Devi Anom Sari et al., 2024). Therefore, support for teachers in understanding differentiation strategies is urgent.

Initial observations at SDN 03 Geragahan show that some teachers have tried to implement differentiated learning in science subjects through training and workshops. However, its implementation is still inconsistent and needs further study regarding its effectiveness and implementation challenges. Based on these conditions, this study aims to analyze the application of differentiated learning in the Independent Curriculum in class V science subjects, as well as examine its impact on students' experiences and learning outcomes.

## Method

This study uses a descriptive qualitative approach with a field research design. This approach was chosen because it allows researchers to gain an in-depth understanding of the phenomena that occur naturally in the research environment. Through direct observation, the researcher participates in the social context in which the research takes place to comprehensively observe the implementation of differentiated learning. This approach generates descriptive data in the form of written and spoken words from participants, as well as observed behaviors (Noermanzah et al., 2022; Ristiyati et al., 2023). The research focuses on the implementation of differentiated learning in science subjects in class V at SD Negeri 03 Geragahan.

This research was carried out at SD Negeri 03 Geragahan, which is one of the elementary schools that has implemented the Independent Curriculum. This setting was chosen because it is aligned with the research objectives to explore differentiated learning practices in elementary schools. The research subjects consist of school principals, teachers, and class V students who are directly involved in the implementation of learning. The selection of subjects was carried out by purposive sampling, which is based on considerations of

involvement and relevance to the focus of the research, so that the data obtained can represent the actual conditions in the field.

The research instruments used functioned to obtain and interpret data in accordance with the research objectives (Lestari et al., 2024; Mirawati et al., 2022; Tundreng et al., 2025). The instruments used include observation guidelines, interview guidelines, and documentation studies. Observation guidelines are used to record the activities of teachers and students during the differentiated learning process. The interview guidelines are prepared in the form of open-ended questions that aim to explore participants' views, experiences, and perceptions regarding the implementation of differentiated learning. Meanwhile, a documentation study was carried out to complete the data through the analysis of school documents such as vision and mission, organizational structure, data on the number of teachers and students, and documentation of learning activities relevant to the Pancasila student profile.

Data collection was carried out through three main techniques, namely participatory observation, in-depth interviews, and documentation studies. Participatory observation is carried out with the direct involvement of the researcher in learning activities to understand the context of the implementation of differentiated learning naturally. In-depth interviews were conducted with principals, teachers, and students to obtain comprehensive information regarding their views and experiences (Dania & Andriani, 2021; Mw et al., 2023). Documentation techniques are used as a complement to strengthen the validity of observation and interview data, by examining various written documents and recordings of relevant learning activities (Arikunto, 2013).

Data analysis was carried out inductively using an interactive analysis model from Miles and Huberman which consisted of three stages, namely data reduction, data presentation, and conclusion drawing and verification (Sugiyono, 2018). At the data reduction stage, the researcher selects and simplifies the raw data to match the focus of the research. The data presentation stage is carried out in the form of a descriptive narrative to describe the research findings in a systematic manner. Meanwhile, the conclusion stage is carried out by interpreting the results of the analysis to answer the formulation of the research problem. The results of this analysis are expected to provide an in-depth understanding of the implementation of differentiated learning in the context of the implementation of the Independent Curriculum at SD Negeri 03 Geragahan.

## Results and Discussion

### *General Findings*

This study describes the implementation of differentiated learning in class V science subjects at SD Negeri 03 Geragahan, Agam Regency, West Sumatra Province. Data collection was carried out starting in September 2025, after obtaining the initial research and observation permit in August 2025, including interviews with school principals, teachers, and students.

The school is a public school with "B" accreditation, has the status of a core school in Cluster 3 of Lubuk Basung District, and has implemented the Independent Curriculum as part of efforts to transform student-based learning. The school's profile shows a fairly good institutional readiness, with adequate facilities and a conducive learning environment.

The student profile shows a diversity of academic abilities, interests, learning styles, and socioeconomic backgrounds (majority of middle to lower). This condition is an important context for the implementation of differentiated learning. Educators and education staff consist of 15 people who have various employment statuses (civil servants, PPPK, honorary), showing collaboration between professions in the implementation of learning. Overall, the schools have an adequate foundation to support differentiated learning.

The school's facilities and infrastructure are in adequate condition: six regular classrooms, teachers' rooms, a library, complete sanitation, and other support facilities. However, to support 21st century learning and optimal differentiation, there are still opportunities to develop facilities such as art rooms, counseling rooms, and further digital technology. The combination of institutional readiness, diversity of students, and educator support forms the contextual foundation for the implementation of differentiated learning in this school.

### *Special Findings*

#### *Differentiated Learning Planning*

Differentiated learning planning at SD Negeri 03 Geragahan is carried out in a collaborative and structured manner, involving teachers, principals, school committees, parents, and the education office. The principal said that communication forums through class groups and school committees are used to identify students' learning needs and propose policy recommendations. This practice is in line with the principle of stakeholder participation in the development of responsive learning (Wiakta Putri & Mangunsong, 2024).

Learning technology facilities such as infocus and internet networks have been provided as part of the differentiated learning adaptation strategy. However,

technical obstacles are still found, such as weak signals in some classes, so teachers must continue to provide offline learning alternatives. This shows that infrastructure is an important factor in the implementation of differentiated learning (Dewanti et al., 2024).

Teachers conduct diagnostic assessments at the beginning of learning to map students' readiness, interests, and learning styles. The assessment results data serve as the basis for the preparation of teaching modules that are adjusted to the characteristics of students and then evaluated regularly in meetings every two weeks. This process reflects reflective and participatory practices in differentiated learning planning (Kristiyuana et al., 2025).

Overall, the school's differentiated learning planning demonstrates a strong orientation toward student diversity, the use of initial data for learning adjustments, and ongoing collaborative evaluation.

#### *Implementation of Differentiated Learning*

The implementation of differentiated learning in science subjects in grade V shows systematic adaptation to the diverse needs of students. Teachers start with a pre-test as a diagnostic assessment to map students' learning readiness, then group students into three categories: good, adequate, and poor. The adaptation strategy of materials and activities is carried out based on the mapping.

In addition, teachers also map students' interests and learning styles through observation, with the main identification results being the tendency to draw, write stories, and hand skills. Based on this interest, teachers design activities such as posters, narratives, and skill works, which reflect the principles of content, process, and product differentiation (Agung et al., 2024; Nurmawanti et al., 2023).

The implementation includes three stages: introduction (building student readiness through greetings, national anthems, spark questions), core (collaborative activities that relate students' experiences to food chain concepts through different case studies), and closing (reflection, concept reinforcement, enrichment/remedial). This initiative shows that learning is not linear one-way, but responsive to student diversity.

Thus, the implementation of differentiated learning in this school has utilized a concrete adaptive strategy, reflecting the principles of the Independent Curriculum that emphasizes student-centered learning and alignment with individual needs.

#### *Differentiated Learning Assessment*

Assessment in differentiated learning at SD Negeri 03 Geragahan is carried out through a combination of

diagnostic, formative, and summative assessments. Teachers conduct diagnostic assessments at the beginning of learning and routine formative assessments at the end of each session. Thus, assessment functions not only as a measuring tool for outcomes, but also as a means of reflection and adaptive learning follow-up.

The teacher stated that although differentiated learning is applied, the questions are not distinctly differentiated so as not to cause social jealousy, except for students with special needs who are given adjustments according to their abilities. This approach reflects the principle of fairness in learning differentiation.

Classroom reflection is an integral part of assessment: teachers and students discuss learning experiences, challenges, and achievements, and then teachers design enrichment or remedial assessments according to students' needs. Technology-based assessments are also implemented through platforms such as the Independent Teaching Platform (PMM) and digital education report cards. This shows that differentiated assessments not only measure outcomes but also facilitate the growth of student learning in a sustainable and inclusive manner.

Overall, the assessment system in this school has fulfilled the principles of holistic differentiated learning assessment, reflection, and follow-up within the framework of the Independent Curriculum.

## Conclusion

Differentiated learning planning in science subjects in grade V of SD Negeri 03 Geragahan has been carried out collaboratively and in a structured manner by involving teachers, principals, committees, and parents to identify students' learning needs holistically. Its implementation is carried out through systematic stages based on diagnostic assessments to map the readiness, interests, and learning profiles of students, then outlined in teaching modules and applied with varied learning strategies and the use of the Independent Teaching Platform as a source of teacher professional development. The learning environment is also adjusted to be more adaptive to student needs, reflecting the principle of student-centered learning as mandated in the Independent Curriculum. Assessment is carried out on an ongoing basis through diagnostic, formative, and summative assessments that are inclusive and fair for all students, including those with special needs. Despite technical constraints and limitations in teachers' understanding of the new policy, the school has shown a strong commitment to creating adaptive, collaborative, and humanistic learning. Overall, the implementation of differentiated learning at SD Negeri 03 Geragahan

reflects institutional readiness and the transformation of learning culture toward education that is on the side of students and in line with the spirit of the Independent Curriculum.

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## Author Contributions

Conceptualization, R. and R.; methodology, R.; formal analysis, R; investigation, R.; resources, R.; data curation, R.; writing—original draft preparation, R.; writing—review and editing, R, R, A, Z.; visualization, R.; supervision, R,R.; project administration, R.; funding acquisition, R. All authors have read and agreed to the published version of the manuscript.

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## Conflicts of Interest

The authors declare no conflict of interest.

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