

# Development of Guided Inquiry-Based Student Worksheets on the Concept of Classification of Living Organisms to Train Students Science Process Skills

Siti Padliah, Sjaifuddin\*, Trian Pamungkas Alamsyah

Natural Science Education, Universitas Sultan Ageng Tirtayasa, Banten, Indonesia

\*e-mail: [sjaifuddin@untirta.ac.id](mailto:sjaifuddin@untirta.ac.id)

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**Abstract:** Science learning in schools should not only emphasize conceptual understanding but also foster science process skills that train critical thinking, analytical reasoning, and problem-solving abilities. However, classroom practice is still dominated by rote memorization, leaving students' science process skills underdeveloped. This study addresses the gap by developing a Guided Inquiry-based Student Worksheet on the concept of living things classification. The unique contribution of this student worksheet lies in its integration of guided inquiry phases with authentic classification activities, enabling students to engage in exploration, observation, and independent analysis. Unlike conventional worksheets that mainly provide summaries or drill questions, this product is designed to stimulate scientific investigation and active participation. The research adopted the 4D development model (Define, Design, Develop, Disseminate), although this study was limited to the Develop stage. Nine validators (three media experts, three material experts, and three science teachers) and 35 seventh-grade students participated as respondents. Validation results indicated an average feasibility score of 86.9% ("highly feasible"), while student responses reached 87.2% ("very positive"). These findings confirm that the developed student worksheet is not only valid in terms of content and presentation but also well-received by students. Beyond providing an alternative learning material, the broader implication of this study is that Guided Inquiry-based student worksheets can serve as a strategic tool to cultivate science process skills by combining discovery learning with real-life classification practices. Consequently, this product has the potential to enrich science learning with more meaningful and activity-oriented approaches, while preparing students to face 21st-century challenges that demand critical thinking, collaboration, and evidence-based reasoning.

**Keywords:** Classification of Living Organisms; Guided Inquiry; Science Process Skills; Student Worksheets.

## Introduction

Science learning involves a structured process of investigating nature, so that science is not only considered as a collection of facts, but also as the result of a process of discovery. Effective science learning must be able to instil meaning and understanding of the scientific process in students, connect scientific concepts with everyday life situations, and encourage them to build independent understanding of the material being studied [1]. The implementation of science learning should refer to four main standards. First, content standards play a role in equipping students with the necessary basic knowledge. Second, process standards aim to develop scientific skills, thinking skills, and thinking strategies. Third, scientific inquiry standards facilitate the development of critical and creative thinking skills in students. Fourth, assessment standards are used to assess students' abilities based on their authentic learning experiences [2]. Achieving these four standards requires students' active involvement in inquiry activities supported by relevant and creatively designed teaching materials and media.

Teaching materials are structured in a systematic way to help students understand and master the material. Besides serving as a source of information, teaching materials are also used as a reference for designing and implementing a

planned and structured learning process [3]. Teaching materials serve as a tool that supports teachers in delivering learning materials, which ultimately fosters students' interest and curiosity in the material. Teaching materials can be in written or non-written form, adapted to the needs and conditions of the ongoing learning process.

Interviews with science teachers at junior high schools in Cigemblong District indicate that the use of Student Worksheets as teaching materials has been suboptimal. The student worksheet in circulation generally contains only material summaries and practice questions, thus lacking a learning experience that demands scientific skills. Science instruction should not only teach concepts but also equip students with science process skills (SPS) relevant to everyday life. This situation demonstrates a gap between the demands of a scientific process-based curriculum and the reality on the ground. The novelty of this research lies in the development of a guided inquiry-based student worksheet that systematically guides students through the steps of scientific investigation. Unlike a conventional student worksheet, this student worksheet is designed so that students not only read and answer questions but also experience the process of observation, classification, hypothesis testing, and communication of results. Thus, the student worksheet functions not only as a learning resource but also as a vehicle for practising scientific skills.

## How to Cite:

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Current science learning emphasizes the scientific process through problem solving, from formulating hypotheses to drawing conclusions. The focus is on the development of Science Process Skills (SPS), which encompass intellectual, social, and physical abilities, with the stages of observing, asking, reasoning, trying, and applying [4]. Science process skills are important competencies that include basic skills such as observing, classifying, and measuring, as well as integrated skills such as formulating hypotheses, designing experiments, and interpreting data. The low level of these skills in students is influenced by several factors, including a lack of motivation for students to solve problems independently and minimal training in collaboration and direct exploration of concepts. In addition, learning approaches that still rely heavily on the dominant role of teachers cause limited student involvement in the learning process [5]. One solution that researchers can take to overcome this problem is to develop Student Worksheets.

Student Worksheets are teaching materials that help accelerate the delivery of material while facilitating student understanding more effectively [6]. Student Worksheets are a type of teaching material that functions as a tool in the process of identifying, developing, and evaluating the content and learning strategies implemented by educators [7]. Student worksheet functions as a tool to help teachers design, implement, and evaluate learning, with important elements being the title, material, instructions, and tasks that students must complete. Its role includes supporting active learning, optimizing time, developing cognitive aspects and problem solving, and providing materials according to learning objectives [8]. Its preparation goes through the stages of curriculum analysis, identifying needs, determining the title, and writing the content. In addition, the student worksheet also functions as a learning medium that can instil positive values in students.

In order for the student worksheet to be used optimally, an appropriate learning model is required, one of which is inquiry. The development of a science student worksheet combined with the inquiry model can increase active student involvement, train critical thinking, and foster a scientific attitude. According to Budiyo and Hartini [9], inquiry learning requires students to be involved in planning and implementing experiments, collecting and analyzing data, and drawing conclusions that focus on problem solving. Thus, students play an active role in finding solutions to problems posed by the teacher.

Guided inquiry focuses on investigative activities that require students to formulate problems, formulate hypotheses, conduct experiments, analyze data, and draw conclusions. This process not only trains intellectual skills but also fosters scientific attitudes such as thoroughness, honesty, and openness to data. Thus, this model is effective in encouraging students to connect scientific concepts with real-life phenomena [10]. The guided inquiry model was chosen because it best suits the characteristics of junior high school students. At this stage, students are not yet fully ready to conduct independent investigations as required in free inquiry. When using discovery learning, student activities tend to be limited to simple explorations without a complete investigative structure. Meanwhile, Problem-Based Learning (PBL) emphasizes solving complex problems that often exceed the cognitive capacity of junior high school

students. By providing gradual direction, guided inquiry provides a balance between teacher guidance and student learning independence.

Based on this background, this study aims to develop a guided inquiry-based student worksheet on the concept of classification of living things. This worksheet is expected to be an alternative teaching material that is more meaningful and able to train science process skills. Thus, this study carries the title: "Development of Student Worksheets. Based on Guided Inquiry on the Concept of Classification of Living Things to Train Students' Science Process Skills." This research contributes to efforts to strengthen science learning that is based on activities, discoveries, and active involvement of students.

## Research Methods

This development research uses the 4D model (Define, Design, Develop, Disseminate) developed by Thiagarajan (1974) [11], with a limited focus up to the Develop stage. The research subjects consisted of various parties involved in assessing the academic feasibility of the product. A total of nine validators were selected purposively, consisting of three lecturers as material experts, three lecturers as media experts, and three junior high school teachers as learning practitioners, selected based on their relevant experience and competencies to assess aspects of material, media, and implementation in the classroom. In addition to validators, student involvement is an important component in evaluating responses to the use of a guided inquiry-based student worksheet. A total of 35 seventh-grade students of SMP Negeri 3 Cigemblong were selected as samples using a purposive sampling technique, because students in this group represent the general characteristics of junior high school students who are studying the concept of classification of living things and have science process skills that are still developing. A sample size of 35 people is considered adequate to obtain representative response data, while also allowing effective interaction in the use of the student worksheet in the classroom.

Participant criteria were carefully considered. Validators were selected based on academic expertise and practical experience, while students were selected from the same class to ensure consistency in measuring responses to the worksheets. Ethical considerations were also applied in this study, including obtaining written consent from the school, teachers, and parents, as well as students' willingness to participate. The researcher guaranteed the confidentiality of participants' identities and ensured that participation was voluntary without pressure or negative consequences.

Data collection utilized a combination of qualitative and quantitative approaches. Qualitative data were obtained from interviews and observations of students' interactions with the worksheets, while quantitative data were obtained through validation questionnaires conducted by experts and student responses. This combined approach was chosen to obtain a comprehensive evaluation of the quality and effectiveness of the guided inquiry-based worksheets, both in terms of content, media, and student acceptance.

The study was conducted at SMP Negeri 3 Cigemblong in August 2024. The location was selected purposively, considering that this school has student characteristics and science learning conditions that align

with the research focus. With this procedure, the research is expected to produce valid and relevant data to assess the feasibility and effectiveness of the student worksheet being developed.

The researchers designed a validation questionnaire and student response sheet containing several statements as assessment indicators. Validators and students were asked to respond to each statement by selecting one of the available categories by marking "(√)." Assessment was conducted based on a five-point Likert scale, as outlined in Tables 1 and 2.

**Table 1.** Validation Analysis Questionnaire Assessment Scores

Answer Options	Score
Very Good (SB)	5
Good (B)	4
Not good (KB)	3
Not Good (TB)	2
Very Bad (STB)	1

[12]

**Table 2.** Student Response Assessment Scores

Answer Options	Score
Strongly Agree (SS)	5
Agree (S)	4
Disagree (DS)	3
Disagree (DS)	2
Strongly Disagree (DS)	1

[13]

The results obtained from the validation sheet and student responses to the Student Worksheet based on guided inquiry were analyzed by applying the following formula:

$$P = \frac{F}{N} \times 100\%$$

Description:

P: Percentage value obtained

F: Total score obtained

N: Maximum total score [14]

The results of the percentage of eligibility obtained from the assessment are then analyzed and classified into certain categories according to the guidelines listed in Table 3.

**Table 3.** Eligibility Criteria

Percentage score (%)	Interpretation
0% - 20%	Very Unfit
21% - 40%	Less Fit
41% - 60%	Quite Fit
61% - 80%	Fairly Fit
81% - 100%	Fit

[14]

## Results and Discussion

This research is a development study that focuses on designing Student Worksheets by integrating a guided inquiry-based learning model. The development model used is the 4D model, limited by Thiagarajan, which was introduced in 1974 [11]. Although the model is structured in

four main stages, the researcher only involved three stages in the development process. The steps for developing a guided inquiry-based student worksheet include: 1) The define stage, which includes initial analysis, namely the analysis used to identify and formulate the main problems for developing a student worksheet. This analysis is obtained based on facts found in the school where the research is conducted. To obtain initial data based on facts that occur in the school, it is necessary to conduct interviews with science teachers. Based on the results of an interview with one of the science teachers at SMP Negeri 3 Cigemblong, information was obtained that the curriculum implemented in grade VII is the Independent Curriculum. The material that is considered difficult to understand by students in grade VII is the classification of living things, because there are many unfamiliar terms that are not yet understood by them. To understand student characteristics, an analysis was conducted covering various aspects, such as academic ability (knowledge), cognitive development, and individual and social skills. This analysis aims to adapt learning materials, media, formats, and language to suit student needs [15]. Based on the analysis of seventh-grade students at SMP Negeri 3 Cigemblong, along with input from science teachers, it was found that students' academic abilities varied. This variation was reflected in daily test results, which showed differences in achievement, ranging from high-achieving students to those in the medium and low categories. As a follow-up to these findings, the proposed solution was to design Student Worksheets based on a guided inquiry model, aimed at practicing science process skills in science learning.

Task analysis was conducted by identifying the types of assignments given by teachers in the student worksheet, which serve as the primary means of developing student skills. This analysis process was carried out to determine learning content that aligns with core competencies and the material to be taught [16]. The results of the task analysis indicate that the form of assignment given by the science teacher in the student worksheet still does not meet the basic competency of skills and does not use any learning model. The student worksheet only contains discourse or brief information about the material being studied, and the next activity is to work on the assignment in groups. Concept analysis at the concept analysis stage is carried out by learning analysis activities in accordance with the curriculum used. [17]. The student worksheet developed must consider the Learning Outcomes (CP) contained in the Independent Curriculum. This analysis is carried out to determine the concepts that will be applied in learning. The learning outcomes used are phase D, where students are expected to be able to classify living things and objects based on observed characteristics. The student worksheet developed applies the syntax of the guided inquiry model, starting from the orientation stage to formulating conclusions. In the analysis of learning objectives, this stage is carried out by identifying the results of the concept analysis and task analysis that have been carried out previously. Analysis of learning objectives is used in formulating and determining the learning objectives obtained by students [16].

2) The design stage is a continuation of the definition stage, which is carried out by compiling an initial design for the creation of a guided inquiry-based student worksheet on the concept of classification of living things. The initial

design is carried out to produce a student worksheet that will be developed based on the provisions for compiling LKPD in general, by paying attention to the learning outcomes used in the concept of classification of living things according to the independent curriculum. It is followed by the preparation of research instruments, format selection, and initial products. The development of the 4.0 revolution era is able to have quite an impact on the world of education, especially during the teaching and learning process [18]. In this context, the development of Student Worksheets is carried out by utilizing applications that function as tools in designing teaching materials. The application is designed to support the process of compiling student worksheets more effectively and efficiently. The design of this student worksheet is assisted by using the Canva application. This student worksheet is created by paying attention to the design and layout, and then product validation is carried out by several validators according to their fields of expertise. Validators are determined through the results of discussions with the supervising lecturer, resulting in the appointment of 9 validators to comprehensively assess the feasibility of the student worksheet. The validator composition consists of 3 material experts, 3 media experts, and 3 practitioners. After the product validation process, the next step is to make revisions based on input provided by the validators. After the student worksheet is revised, the next stage is to conduct a readability test involving 35 students. 3) The development stage is the phase in which the process of creating a student worksheet based on guided inquiry is carried out. This process consists of three main activities, namely: product validation by a number of experts according to their fields of expertise, product improvements or revisions based on comments and suggestions from experts, and product readability testing through the distribution of questionnaires. These steps are carried out to evaluate the feasibility of the student worksheet that has been designed in the previous design stage. The following are the results of the validation test that has been carried out by material experts, media experts, and practitioners.

**Table 4.** Expert Validation Results for Guided Inquiry-Based Student Worksheets

Validator	Score	Category
Material Validator	85.3%	Very Eligible
Media Validator	86.9%	Very Eligible
Practitioner Validator	88.7%	Very Eligible
Overall	86.9%	Very Eligible

Table 4 shows the validation results of the guided inquiry-based student worksheet (LKPD) by nine validators: three material experts, three media experts, and three practising teachers. The assessment results showed an average score of 85.3% for the material validators, 86.9% for the media validators, and 88.7% for the practising teachers. Overall, the LKPD obtained a score of 86.9%, which falls into the "Very Feasible" category. These results indicate that the developed LKPD meets the criteria for academic feasibility, both in terms of content quality, media presentation, and suitability for classroom learning practices.

Theoretically, these findings align with literature stating that guided inquiry-based teaching materials can improve learning quality and support the development of students' science process skills [10]. High validation from

the material experts indicates that the student worksheet content aligns with the concept of classification of living things and science curriculum standards. High scores from the media validators confirm that the student worksheet presentation and layout are effective in facilitating student engagement, while scores from the practising teachers confirm the feasibility of implementing the student worksheet in practice in the classroom.

From a practical perspective, these results indicate that teachers can use this Student Worksheet as an adequate learning medium to support guided inquiry activities. With a "Very Adequate" rating, the student worksheet is believed to be able to guide students in formulating problems, formulating hypotheses, conducting experiments, and systematically analyzing and presenting data. This has the potential to improve science process skills, scientific attitudes, and active student participation in the classroom.

However, this study has limitations that require consideration. First, the validation sample was relatively small (9 validators), and student responses came from only one school, thus limiting the generalizability of the results. Second, the involvement of only one class or school makes the evaluation of student responses to the student worksheet less representative of the broader population. Therefore, further research is recommended involving more schools, classes, and a variety of student characteristics so that the validation results can be more generalizable to broader educational contexts.

Based on the assessment results by the material experts, the validity score reached 85.3%, which falls into the "Very Appropriate" category. Details of the assessment components from the material expert validators are presented in Table 5.

**Table 5.** Validation Results by Material Experts

Aspects assessed:	Score	Criteria
Content suitability	77.1%	Eligible
Presentation	90.0%	Very Eligible
Language	88.8%	Very Eligible
Overall	85.3%	Very Eligible

Table 5 shows the validation results of the guided inquiry-based student worksheet by subject matter experts. The three main aspects assessed were content, presentation, and language suitability. The content suitability aspect scored 77.1%, categorised as "Appropriate." The presentation aspect scored 90.0%, categorized as "Very Appropriate." The language aspect scored 88.8%, categorised as "Very Appropriate." Overall, the average validation score by subject matter experts was 85.3%, categorized as "Very Appropriate."

The content adequacy aspect scored 77.1%, categorized as "Appropriate." This result indicates that the LKPD content aligns with the curriculum and learning objectives. However, there are still several areas for improvement, such as deepening the material or connecting concepts to everyday life contexts. This aligns with Prastowo's [21] opinion that good teaching materials must not only align with basic competencies but also be relevant to students' learning experiences. Therefore, even though it is categorized as "Appropriate," strengthening the depth of content and linking it to real-world phenomena will improve the quality of the student worksheet.

The presentation aspect scored 90.0%, categorized as "Very Appropriate." A high score for the presentation aspect confirms that the student worksheet structure and appearance are capable of facilitating a coherent and systematic guided inquiry learning process. The student worksheet was deemed engaging and made it easier for students to follow the steps of the investigation. This supports the literature stating that systematic presentation can increase student interest and motivation [22]. This means that this student worksheet has the potential to encourage active student involvement in the learning process.

The language aspect scored 88.8%, categorized as "Appropriate." "Very Appropriate." The linguistic aspect received a high score because the language used was considered communicative, appropriate to the cognitive development level of junior high school students, and easy to understand. According to Prastowo [21], the language in teaching materials must be simple, straightforward, and appropriate to the students' abilities so that the learning message can be conveyed effectively. These results indicate that the Student Worksheet meets the principle of readability, thus supporting a smooth teaching and learning process.

Overall, the validation results from the material experts, which achieved the "Very Appropriate" category, reinforce the finding that the guided inquiry-based student worksheet can be used as a learning resource to support the improvement of science process skills. This finding aligns with Trianto's theory [23], which states that the guided inquiry model is effective in developing students' critical thinking skills and conceptual understanding. From a practical perspective, this student worksheet is quite ready for use by teachers in the classroom with a few minor improvements to the content, for example, by adding depth to the explanation of the concept of classification of living things or enriching it with contextual examples. With these improvements, the student worksheet will be even more optimal as a learning medium that is not only engaging but also meaningful for students.

The results of the validity score calculation conducted by the Media Expert showed a value of 86.9%, which is classified as very adequate. The assessment components by the Media Expert validator can be seen in Table 6.

**Table 6.** Validation Results by Media Experts

Aspects assessed:	Percentage	Criteria
Graphics	86.6%	Very Eligible
Appearance	86.6%	Very Eligible
Language	87.7%	Very Eligible
Overall	86.9%	Very Eligible

Table 6 presents the validation results of the guided inquiry-based student worksheet by media experts. The three aspects assessed were graphics, display, and language. The graphics aspect scored 86.6%, categorized as "Very Appropriate." The display aspect also scored 86.6%, categorized as "Very Appropriate." The language aspect scored 87.7%, categorised as "Very Appropriate." Overall, the average validation score by media experts was 86.9%, categorized as "Very Appropriate."

The graphics aspect scored 86.6%, categorized as "Very Appropriate." This score indicates that the layout and use of illustrations in the student worksheet were assessed as aligning with the principles of instructional design.

According to Arsyad [22], good graphics can help clarify content and facilitate student understanding. Engaging visuals can also increase student attention, making learning more effective. Therefore, the graphics in this student worksheet meet the standards for modern teaching materials that support readability and clarity of information.

The display aspect received a score of 86.6%, categorized as "Very Appropriate." This result confirms that the Student Worksheet has been designed to be attractive, proportional, and consistent in the selection of colors, icons, and page structure. This is important because an organized and consistent display can reduce students' cognitive load, allowing them to focus more on the substance of the material. Therefore, this student worksheet is considered visually appealing and able to support student engagement in the inquiry-based learning process.

The language aspect received a score of 87.7%, categorized as "Very Appropriate." A high score on the language aspect in the media validation indicates that the text presented is not only appropriate in content but also clear, concise, and communicative in terms of media design. This is consistent with Prastowo's theory [21], which states that effective teaching materials are determined not only by the quality of the content but also by the clarity of the language used in the media. This means that this student worksheet successfully integrates graphic and language elements, facilitating student understanding.

Overall, the media expert validation score of 86.9% (categorized as "Very Adequate") reinforces the view that visual design and aesthetic aspects play a crucial role in the effectiveness of teaching materials. In practice, this Student Worksheet is ready to be used as a teaching material with good media quality. However, minor improvements can still be made, for example, by adding a variety of illustrations that are more contextual to science phenomena or refining the layout to further facilitate the flow of inquiry. Thus, this student worksheet is not only a learning aid but also a tool capable of enhancing student motivation, engagement, and the overall learning experience.

The validity score calculation based on the Expert Practitioner assessment yielded a score of 88.7%, categorized as very appropriate. The Expert Practitioner validator assessment components can be seen in Table 7.

**Table 7.** Validation Results by Practitioner Experts

Aspects assessed	Score	Criteria
Ease of use	86.6%	Very Eligible
Presentation	91.1%	Very Eligible
Benefits	88.5%	Very Eligible
Overall	88.7%	Very Eligible

Table 7 shows the validation results of the guided inquiry-based student worksheet by practitioners (junior high school teachers). The assessment covered three main aspects: ease of use, presentation, and usefulness. The ease of use aspect scored 86.6%, categorized as "Very Appropriate." The presentation aspect received the highest score of 91.1%, categorised as "Very Appropriate." The usefulness aspect scored 88.5%, categorized as "Very Appropriate." Overall, the average score was 88.7%, categorized as "Very Appropriate."

The ease of use aspect scored 86.6%, categorized as "Very Appropriate." This score indicates that the LKPD is

easy for both teachers and students to use in learning activities. Ease of use includes clarity of instructions, appropriate flow of activities, and a level of simplicity that facilitates teachers' implementation of the student worksheet in the classroom. This aligns with the findings of Sanjaya [24], who emphasized that good teaching materials should facilitate users' understanding of learning steps without creating ambiguity. Therefore, this student worksheet is practically applicable in the context of junior high school science learning.

The presentation aspect received a score of 91.1%, categorized as "Very Appropriate." The presentation aspect received the highest score, indicating that this Student Worksheet was considered very good in terms of structural order, systematic presentation, and content appeal. According to Prastowo [21], a systematic and engaging presentation of teaching materials can facilitate student understanding of concepts and maintain learning motivation. The high score in this aspect also supports Arsyad's [22] statement that good presentation plays a crucial role in harmoniously integrating media, text, and learning activities.

The benefits aspect received a score of 88.5%, categorized as "Very Appropriate." These results indicate that the student worksheet is considered beneficial in supporting the guided inquiry-based science learning process. Teachers assessed that this student worksheet not only helped students understand the concept of classifying living things but also practised science process skills through investigative activities. This is consistent with Rustaman's [25] opinion, which emphasized that inquiry-based student worksheets can provide meaningful learning experiences, train critical thinking, and foster scientific attitudes in students.

Overall, the practitioner validation results with a score of 88.7% (category "Very Feasible") strengthen the evidence that the guided inquiry-based student worksheet has high practical quality for use in science learning at the junior high school level. This result is also consistent with the literature stating that the feasibility of teaching materials is not only determined by theoretical aspects (materials and media), but also by practical aspects through teacher assessments as direct users. For practice, this means that the developed student worksheet already has a high level of usability, attractiveness, and usefulness, making it suitable for implementation in real classrooms. However, limitations of this study should be noted, for example, the practitioner validation only involved three teachers from one school. Therefore, trials on a wider scale and in various school contexts are highly recommended for stronger generalization of product quality.

The following is a display of the student worksheet that was developed (Figures 1, 2, 3, and 4). After being validated and revised based on suggestions and input from experts, the Student Activity Sheets then underwent a readability test. This readability test aims to obtain direct assessments from students. Thus, this activity serves to measure student responses to the developed student worksheet.



**Figure 1.**  
Worksheet Cover



**Figure 2.** Learning Outcomes



**Figure 3.** Sub-Chapter of Material



**Figure 4.** One of the syntax of guided inquiry

The readability test is conducted by completing a readability questionnaire, where students are asked to provide assessments regarding various aspects of the student worksheet, such as clarity of language, ease of understanding, and the appeal of the material. The results of this readability test will provide valuable information for further improvements, so that the student worksheet can be more effective in supporting the learning process. The readability test aims to obtain an overview of the suitability of the teaching materials that have been created [19]. This process is carried out by providing questionnaires to be completed by students after they have been taught using the developed teaching materials. Through these questionnaires, students can provide feedback on various aspects of the teaching materials, such as clarity, ease of understanding, and relevance of the material. The results of this readability test are very important to evaluate the effectiveness of the teaching materials and make necessary improvements so that the teaching materials can be more optimal in supporting the learning process [20]. Several aspects that are indicators in the assessment of the readability test include: 1) Ease of Use: This aspect assesses the extent to which the Student Activity Sheets can be used easily by students during the learning process. 2) Appearance: This aspect evaluates the visual appeal of the student worksheet, including the design, color selection, and layout applied. 3) Language: This aspect assesses the clarity and appropriateness of the language used in the student worksheet, as well as the ease of understanding for students. 4) Guided Inquiry: This aspect measures the extent to which the student worksheet encourages students to conduct inquiries and think critically in the learning context.



The recapitulation of the results of the student questionnaire on the student worksheet, based on guided inquiry on the concept of classification of living things, is as follows.

Table 8 displays the readability test results of the guided inquiry-based student worksheets administered to junior high school students. The assessment covered four main aspects: ease of use, display, language, and guided inquiry. The ease of use aspect scored 87.7%, categorized as "Very Good." The display aspect scored the highest at 90.2%, categorized as "Very Good." The language aspect scored 86.8%, categorized as "Very Good," and the guided inquiry aspect scored 83.9%, categorized as "Very Good." Overall, the average score was 87.2%, categorized as "Very Good."

**Table 8.** Summary of the Results of the Student Readability Test Questionnaire

Aspects Assessed	Score	Criteria
Ease of Use	87.7%	Very Good
Display	90.2%	Very Good
Language	86.8%	Very Good
Guided Inquiry	83.9%	Very Good
Overall	87.2%	Very Good

The ease of use aspect scored 87.7%, categorized as "Very Good." This score indicates that students found the student worksheet easy to use, both in terms of instructions, activity flow, and clarity of work steps. This ease of use is important because it helps students focus on the investigation without having difficulty understanding the instructions.

The display aspect scored 90.2%, categorized as "Very Good." The display aspect scored the highest, indicating that students found the student worksheet visually appealing. Quality graphics, illustrations, and a neat layout can increase student engagement. According to Arsyad [22], an attractive visual display can increase student interest in learning and facilitate conceptual understanding. This finding reinforces the importance of aesthetic yet functional student worksheet design as a supporting factor for learning effectiveness.

The language aspect received a score of 86.8%, categorized as "Very Good." This score indicates that the language used in the student worksheet is appropriate for the cognitive development level of junior high school students. The language was deemed communicative, straightforward, and easy to understand. This is consistent with Prastowo's [21] opinion that teaching materials should use simple, clear language that is appropriate to students' characteristics so they can understand the content independently.

The guided inquiry aspect received a score of 83.9%, categorized as "Very Good." This aspect received the lowest score compared to the other aspects, although it is still in the "Very Good" category. These results indicate that although students were assisted by the guided inquiry steps provided (formulating problems, formulating hypotheses, conducting experiments, analyzing data, and drawing conclusions), some still found it difficult to follow the investigation stages. Inquiry learning requires higher-order thinking skills, requiring intensive guidance, especially in the initial stages of implementing this model [25-26].

Overall, the readability test results, with an average score of 87.2% (category "Very Good"), indicate that this guided inquiry-based student worksheet was well understood

by junior high school students. This supports literature that emphasizes the importance of matching teaching materials to student characteristics in order to increase motivation and learning effectiveness [27-28]. From a practical perspective, this demonstrates that the developed student worksheet is not only valid in terms of material, media, and practice, but also can be used by students with a high level of readability. Thus, this student worksheet is suitable for implementation as a science learning medium in schools. However, an important note lies in the guided inquiry aspect, which received the lowest score. This can be used as a reflection that even though students are able to understand student worksheet, they still need teacher support in directing the investigation process.

## Conclusion

Based on research findings related to the development of teaching materials in the form of Student Worksheets that integrate the guided inquiry learning model, it can be concluded that the developed product has a high level of feasibility and effectiveness for use in Natural Science (IPA) learning, particularly on the classification of living things. This conclusion is derived from the average assessment results, where the validity test by experts showed a percentage of 89.7%, which falls into the very valid category. Meanwhile, the readability test by students resulted in a score of 87.2%, which also falls into the very good category. Implications, the results of this study provide important contributions in several aspects. This student worksheet is not only relevant for learning in junior high school science classes but can also be adapted for project-based learning activities, science extracurricular activities, and programs to strengthen scientific literacy in the community. Given that the guided inquiry aspect score is still lower than other aspects, further research can improve this by developing more structured instructions, providing additional scaffolding, or integrating with interactive digital media to make the inquiry process easier for students to follow.

## Author's Contribution

Siti Padliah: Contributed to the planning, implementation, and analysis of the research, as well as developing a conceptual framework for developing student worksheets based on guided inquiry. Compiled a clear, structured, and informative scientific article. Sjaifuddin Sjaifuddin: Provided critical input and suggestions for article improvement and made a significant contribution to ensuring the final quality of the journal article. Trian Pamungkas Alamsyah: Evaluated the submitted article, provided feedback, and ensured that the article met the scientific standards set by the journal. All authors participated in critical discussions at every stage of the research, read, and approved the final manuscript for publication.

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