GeoScienceEd *5(2) (2024)*

Jurnal Pendidikan, Sains, Geologi, dan Geofisika

http://jpfis.unram.ac.id/index.php/GeoScienceEdu/index

Analysis Of Science Literacy Skills Of Grade IV Students On Material Changes In The Form Of Objects

Rismayanti[1], Muhammad Makki[2], Nurwahidah[3], Muhammad Syazali[4]
[1,2,3,4] PGSD FKIP Universitas Mataram

DOI: https://doi.org/10.29303/geoscienced.v5i3.345

Article Info
Received: 11 July 2024
Revised: 28 July 2024
Accepted: 29 July 2024

Correspondence:

Phone: +6282341493091

Abstrac: This study aims to describe the science literacy ability of grade IV students in the aspect of knowledge and competency in the material of changing the form of objects at SDN 39 Cakranegara. This study uses a descriptive qualitative approach with the type of case study research. The data source in this study is teachers and students of grade IV of SDN 39 Cakranegara which totals 21 students and one teacher. The data collection method used was in the form of a written test distributed into 20 multiple-choice questions and 5 essay questions and semistructural interviews. Data analysis was carried out based on the Miles, Huberman and Saldana model with analysis steps, namely: data collection, data condensation, data presentation and conclusion drawn. Data analysis was carried out on 10 grade IV students based on the category of obtaining science literacy scores in the high, medium, low, and very low categories. The results of the study showed that the overall results of the science literacy ability test in grade IV at SDN 39 Cakranegara based on the results of the analysis obtained an average of 52.27 with a very low category. Science literacy ability based on the level of science literacy ability in the knowledge aspect and competency aspect is categorized into very high, high, medium, low and very low criteria. In the aspect of knowledge and the competency aspect of students in the high category, there are indicators of the ability to explain scientific phenomena and indicators of the ability to interpret scientific data and evidence. In the medium category, there are indicators of the ability to interpret data and scientific evidence. In the low category, there are indicators of knowledge of content and indicators of the ability to evaluate scientific data and evidence, and in the very low category, there are indicators of the ability to evaluate and design scientific investigations.

Keywords : scientific literacy skills, knowledge, competence

Citation: Rismayanti, R., Makki, M., Nurwahidah, N., Syazali, M. (2024). Analysis Of Science Literacy Skills Of Grade IV Students On Material Changes In The Form Of Objects. *Jurnal Pendidikan Sains, Geologi, dan Geofisika (GeoScienceEd Journal), 5(3),* 291-307 : https://doi.org/10.29303/geoscienced.v5i3.345

Introduction

Skills in the 21st Century are a fundamental thing that students must have. Developments in the 21st century affect aspects of human life, one of which is science and technology (Kasse & Atmojo, 2022). The development of science and technology makes science literacy skills very much needed in education. In the study (Nasir et al., 2023), it is stated that science literacy is very important to prepare the provision of skills that must be possessed by students in the 21st Century from the elementary school to the tertiary level, which includes critical, creative, collaborative, and communicative thinking skills.

Science literacy is a skill that is applied to define phenomena scientifically or scientifically (Fuadi et al., 2020). PISA 2022 defines science literacy as students' ability to engage with science-related issues, and with science ideas, as reflective citizens (OECD, 2023). It can be concluded that science literacy is a skill in making

Email: yantirisma965@gmail.com

scientific decisions and understanding natural and social phenomena in the surrounding environment, so that it can be applied in daily life. Science is one of the parts of the lesson content in elementary school that prepares students to face daily life in the real world (Astria et al., 2022).

The Independent Curriculum in science learning, namely science, is no longer integrated with other learning, but has been combined between science learning on scientific topics and social studies which is a science science subject (Budiwati et al., 2023). The selection of material for changing the form of objects is based on the data from the summative assessment of grade IV students which is far from the Minimum Completeness Criteria in Science and Science learning. This happens because students do not understand the concepts of science and science learning materials due to misconceptions about the material and from science concepts that have been taught previously (Nurlaili et al., 2023).

Science literacy skills in Indonesia are still relatively low. The results of the PISA assessment of Indonesian students over the last five years, namely 2003, 2006, 2009, 2012, and 2015 had a low average science literacy score in the score range of 382-403 (Hidayah et al., 2019), then in 2018 it decreased by producing a science literacy score of 396 (OECD, 2019) and in 2022 it dropped to 383 (OECD, 2023). Based on PISA assessment data, it can be seen that the science literacy skills of students in Indonesia need to be improved and improved, especially by education units through the cooperation of classroom teachers in schools. In general, science literacy in PISA 2015 focuses on four aspects related to each other, namely knowledge, context, competence, and attitude (Yusmar & Fadilah, 2023). However, lscience iteration in PISA 2018 has been refined and expanded into three aspects that are interrelated with each other, namely the context aspect, the knowledge aspect, and the competency aspect (OECD, 2019)

Basedon the results of observations and initial interviews conducted by researchers in November with fourth grade teachers of SDN 39 Cakranegara, it is known that the learning outcomes of students on material changes in the form of objects have not been maximized and are relatively low. The low learning outcomes of students at SDN 39 Cakrangera are seen from the summative assessment in the scope of material changes in the form of objects that are still below average. It is known that a total of 21 students in class IV including 73 and 60 scored 3 people each, and 15 other students got a score range of 53-27. This means that the increase in student scores is still far from the Minimum Completeness Criteria (KKM) standard. In addition, the refraction of the application of integrated thematic learning in K-13 has an impact on the implementation of the Independent Curriculum which has been implemented in grade IV of SDN 39 Cakranegara. Discussions about science literacy skills have been discussed by previous researchers, including research conducted by (Astria et al., 2022) which analyzed related to science literacy skills in the competency aspect at SDN 21 Ampenan. Similar research was also conducted by (Dwisetiarezi & Fitria, 2021) which analyzed the science literacy skills of students at SDN 11 Gantung Ciri on the context aspect, competency aspect, knowledge aspect, and scientific attitude aspect. Based on the relevant research, the science literacy ability of students is still low in several indicators in PISA 2015, therefore the researcher is interested in analyzing the science literacy ability of students on the material of Changing the Form of Objects in the aspect of knowledge and the competency aspect which refers to the science literacy framework in the cognitive dimension by decrypting the science literacy ability of grade IV students at SDN 39 Cakranegara.

Method

This study uses a descriptive qualitative approach with the type of case study research. The research time was carried out in the even semester of the 2023/2024 school year at SDN 39 Cakranegara. The subjects of the research in this study were students and teachers of grade IV which amounted to 21 students, but who worked on the science literacy ability test questions were 19 students. The object in this study is science literacy ability. The data collection method used is test and interview instruments. The science literacy ability test instrument for grade IV students consists of 25 questions distributed into 20 multiple-choice questions and 5 description questions. The instrument validity test uses the content *validity* test to test the feasibility of the research instrument that will be used to collect data. The researcher analyzed 10 students based on the acquisition of scores in categories, very high, high, medium, low and very low. The analysis of this study uses an analysis model according to Mills, Huberman and Saldana (2014) which includes the steps of analysis activities, namely; data collection, data condensation, data presentation, and conclusion drawn. The following is a table analyzing students' science literacy skills:

Table 1 criteria for science literacy ability

No	Kriteria	Interval
1	Very High	86%-100%
2	High	76%-86%
3	Medium	60%-75%
4	Low	55%-59%

5	Very Low	54%

Source: (Putra, 2022)

The data validity test used in this study is source triangulation and technique triangulation which is interpreted as checking data from various sources with different techniques, (Sugiyono, 2019).

Result and Discussion

The science literacy ability of grade IV students in the material of changing the form of objects at SDN 39 Cakranegara based on the interval of assessment criteria in the very high category there were 0% of students who obtained a score of ≥86. In the high and medium categories, each category obtained as many as 16% of students who obtained a score of ≥60-80 with an average in the high category of 77.78 and an average of 65.55 in the medium category. In the low category, 5% of students obtained a score of ≥55-59 with an average of 55.67. In the very low category, students obtained a score of ≤54 with an average of 42.22. The percentage of results based on the science literacy test questions for grade IV students at SDN 39 is described through the diagram below:

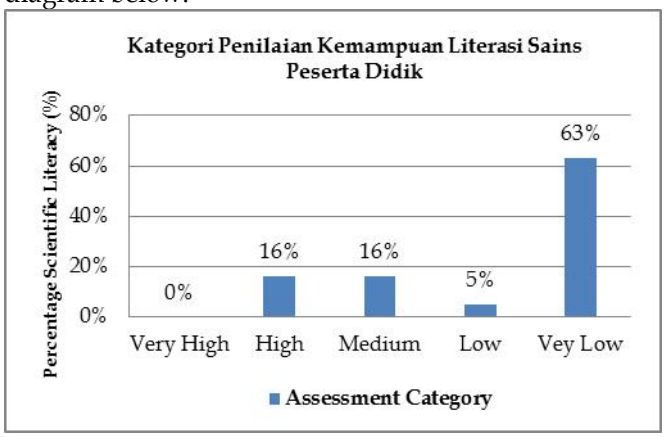

Figure 1 Percentage of science literacy ability

Based on gamabar 1, the presentation of the data of the research results contains information about the science literacy ability of grade IV students at SDN 39 Cakranegara on the material of changing the form of objects based on the framework of science literacy in the cognitive dimension in PISA 2018. Science literacy in PISA 2018 consists of three aspects, namely the context aspect, the knowledge aspect, and the competency aspect. In this study, the researcher analyzed the ability of students by grouping students into very high, high, medium-low, and very low categories based on knowledge aspects and competency aspects. Data on the science literacy ability of grade IV students on the material of changing the form of objects was obtained from the results of the science literacy ability test of students and interviews with teachers and grade IV students which are described as follows:

Science Literacy Ability of Students in the High Category

KKR science literacy skills

The results of the KKR science literacy ability test obtained a score of 80.00 in the high category. The knowledge aspect in the KKR content knowledge indicator has not been able to determine the definition of the change in the form of objects and the definition of gaseous substances in question items 1 and 2. Item 21 of the description question number on the KKR content knowledge indicator is able to answer the question by describing the definitions of liquid and gaseous substances. As an indicator of procedural knowledge, the KKR has been able to sequence the stages of the experiment of changing the form of an object from liquid to gas in the event of cooking water in question number 3 and in the epistemic knowledge indicator of the KKR has been able to determine examples of events that change the form of objects based on illustrations based on question items 4 and 5 and in question item number 22 of the description of the KKR has not been able to mention examples of melting events in their daily lives.

The competency aspect in the indicator of the ability to explain scientific phenomena, the KKR has been able to answer all the questions in the indicator of explaining scientific phenomena. The indicator of the ability to evaluate and design scientific investigations of the KKR has not been able to distinguish questions that are in accordance with the phenomenon of changes in the form of objects through the design of the investigation and have not been able to evaluate and explain a picture with scientific concepts in question items 11 and 14. The indicator of the ability to interpret data and evidence scientifically has been able to answer the questions very well. However, the KKR has not been able to explain why changes in an object can occur. Based on the results of the KKR analysis, below is presented a graph of the value acquisition per indicator that has been answered as follows:

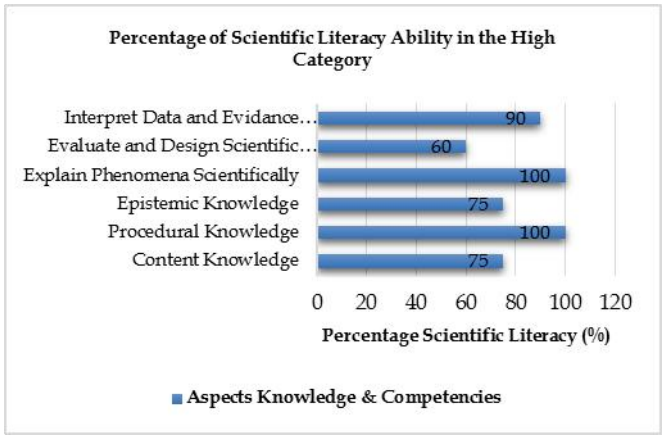

Figure 2 graph of KKR's science literacy skills

Based on the percentage graph of KKR's science literacy ability in figure 2 above, it can be seen that KKR is very high in the indicator of procedural knowledge, the indicator of the ability to explain scientific phenomena and the indicator of the ability to interpret data and evidence scientifically. Content knowledge indicators, epistemic knowledge and indicators for evaluating and designing scientific investigations are found in the medium category based on the interval of science literacy assessment criteria. Based on the results of the interview with the KKR, he was able to understand the concept of material on the change of the form of objects. When the researcher asked about the definitions of liquids, solids and gases and examples, KKR replied:

"The solid substance has a fixed shape like a chair, a table, the liquid substance will follow the shape of the container like oil in a bottle, and the gaseous substance we can feel and the shape is invisible".

This means that the KKR has been able to understand the concept of liquids, solids and gases. This is also supported based on the results of interviews with grade IV teachers that KKR's ability is good and on average above their peers.

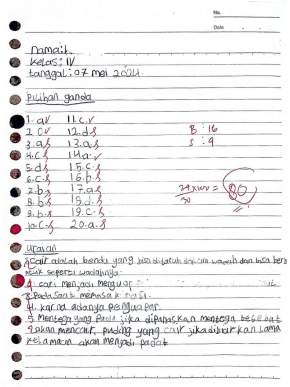

Figure 3 KRR proficiency test results

The science literacy ability of the KKR in the knowledge aspect and the competency aspect are very high in the procedural knowledge indicator, the ability to explain scientific phenomena and the ability to interpret data and scientific evidence. In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena including medium cognitive levels and indicators of interpreting data and evidence scientifically including high cognitive levels (OECD, 2019). KKR students, meaning that they are able to carry out one-step procedures such as remembering facts, principle terms in applying conceptual knowledge to describe a phenomenon in the stage of analyzing complex information or data at a high cognitive level in science literacy. This is also supported based on research (Ardhani et al., 2023) which states that students in the high category have used science literacy skills well, that literacy in science refers to a person's ability to understand scientific concepts, ask and answer relevant questions, draw reasonable conclusions from evidence, and show interest and participation in scientific discourse and activities.

AM's science literacy skills

Hasil tes kemampuan literasi sains AM The results of the AM science literacy ability test obtained a score of 76.67 in the high category. The knowledge aspect of the AM content knowledge indicator has been able to determine the definition of the change in the form of objects and the definition of gaseous substances in question items 1 and 2. Question item number 21 on the content knowledge indicator, AM was also able to answer the question by describing the definitions of liquid and gaseous substances. As for the procedural knowledge indicator, AM has not been able to sequence the stages of the experiment of changing the form of an object from liquid to gas in the event of cooking water in question number 3 and in the indicator of epistemic knowledge, AM has not been able to determine one of the examples of the event of changing the form of an object based on the illustration in question items number 4 and 5 and in the description question item number 22 AM has been able to mention examples of melting events in his daily life.

The competency aspect in the indicator of ability to explain scientific phenomena, AM has not been able to answer question number 8 related to making predictions or hypotheses based on the phenomenon of changing the form of objects. The indicator of AR's ability to evaluate and design scientific investigations has not been able to make questions based on the illustrated text presented, has not been able to propose ways to explore questions and evaluate and explain an image with scientific concepts in question items 10, 13 and 14. The indicator of the ability to interpret data and evidence scientifically AM has been able to answer the question items very well. However, AM has not been able to explain why changes in an object can occur. Based on the results of the AM analysis, below is presented a graph of the value acquisition per indicator that has been answered as follows:

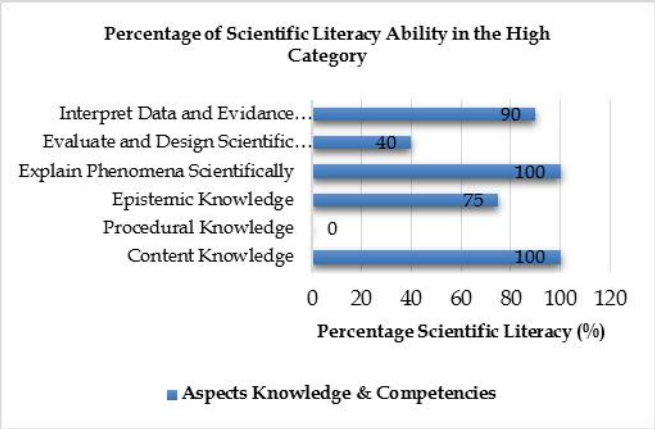

Figure 4 Percentage of AM science literacy ability

Based on the percentage graph of AM science literacy ability in figure 4 above, it can be seen that AM is very high in the content knowledge indicator, the ability to explain scientific phenomena indicator and the ability to interpret data and evidence scientifically. Indicators of epistemic knowledge in the medium category as well as indicators of procedural knowledge and indicators of evaluating and designing scientific investigations based on the interval of the criteria for assessing science literacy ability. Based on the results of the interview with AM, he was able to understand the concept of material on the change of the form of objects. When the researcher asked about the definitions of liquids, solids and gases and examples, AM replied:

"Solid substances are hard and fixed like wood, liquid substances will be in the form of containers like sauce in a bottle, and gaseous substances that can change". This means that AM is able to understand the concepts of liquids, solids and gases. This is also supported based on the results of interviews with grade IV teachers that AM's ability to think, give opinions, and try to answer is good enough, but it is still below the KKR.

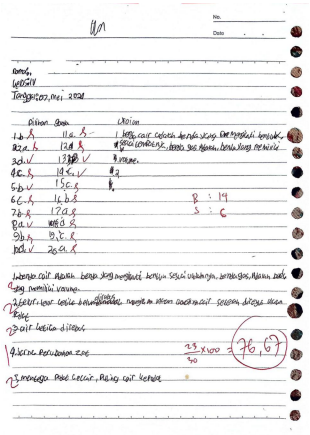

Figure 5 AM proficiency test results

AM's science literacy ability based on the test results obtained a score of 76.67 in the knowledge aspect and a very high competency aspect in the content knowledge indicator, the ability indicator to explain scientific phenomena and the ability to interpret data and scientific evidence. In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena including medium cognitive levels and indicators of interpreting data and evidence scientifically including high cognitive levels (OECD, 2019). AM students, meaning that they are not able to carry out one-step procedures such as remembering facts and stages of analyzing complex information or data in evaluating. This is in line with research (Vashti *et al*., 2020) which found that students have difficulties in answering questions related to how to evaluate and design scientific investigations due to a lack of ability to identify variables in scientific investigations. However, AM is already able to apply conceptual knowledge to describe a scientific phenomenon and interpret scientific data or evidence at a high level of science literacy cognitive.

UAA's science literacy skills

The results of the UAA science literacy test obtained a score of 76.67 in the high category. The knowledge aspect of the UAA content knowledge indicator has been able to determine the definition of the change in the form of objects but has not been able to define the gaseous substance in question number 2. Item number 21 on the content knowledge indicator, UAA was also able to answer the question by describing the definitions of liquid and gaseous substances. As an indicator of procedural knowledge, UAA has been able to sequence the stages of experimenting with the change of the form of an object from liquid to gas in the event of cooking water in question number 3 and in the indicator of epistemic knowledge, UAA has not been able to determine one of the examples of events that change the form of objects based on illustrations based on question items 4 and 5 and in question item number 22 UAA has been able to mention examples of melting events in their daily lives.

In terms of competence in the indicator of ability to explain scientific phenomena, UAA has not been able to answer question number 7 related to identifying an image related to the event of changing the form of an object. The indicator of the ability to evaluate and design scientific investigations UAA has not been able to distinguish questions that are in accordance with the phenomenon of changing the form of objects through the design of scientific investigations and has not been able to evaluate and explain an image with scientific concepts in question items 11 and 14. The indicator of the ability to interpret data and evidence scientifically UAA has not been able to transform a type of image

into the form of a narrative in question number 15. In the item of the description of the UAA, it has not been able to explain why changes in an object can occur.

Based on the graph of the percentage of UAA's science literacy ability in figure 4.3 above, it can be seen that UAA is very high in the procedural knowledge indicator and high in the ability to explain scientific phenomena and the ability to interpret data and evidence scientifically. Content knowledge indicators, epistemic knowledge and indicators evaluate and design investigations based on the interval of science literacy ability assessment criteria. Based on the results of UAA analysis, below is presented a graph of the value acquisition per indicator that has been answered as follows:

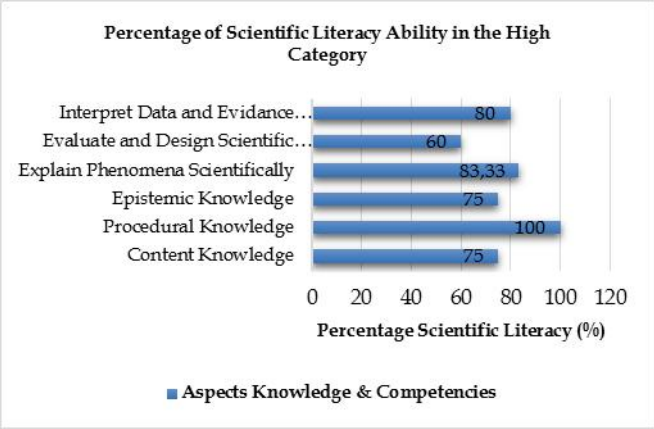

Figure 6 Percentage of UAA's science literacy ability

Based on the results of the interview with UAA, he has been able to understand the concept of material changes in the form of objects very well. When the researcher asked about the definitions of liquids, solids and gases and examples, the UAA replied: "Solids have a constant and hard volume like a rock, liquids are shaped like containers like drinks in plastic, and gaseous substances are invisible and can change like air". This means that UAA is able to understand the concepts of liquids, solids and gases. This is also supported based on the results of interviews with grade IV teachers that UAA is indeed a child who is smart in thinking, giving opinions, willing to try in answering very well, although sometimes UAA does not focus on paying attention, but he is always able to answer every question given.

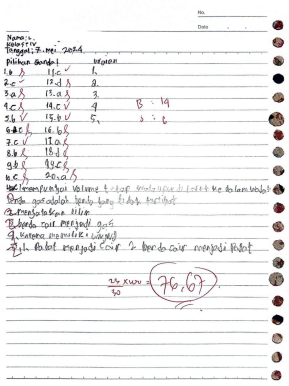

Figure 7 UAA proficiency test results

UAA's science literacy ability based on the test results obtained a score of 76.67 in the knowledge aspect and a very high competency aspect in the procedural knowledge indicator, the ability to explain scientific phenomena indicator and the ability to interpret data and scientific evidence. In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena include medium cognitive levels, and indicators of interpreting data and evidence scientifically include high cognitive levels (OECD, 2019). UAA students, on average, in each indicator are able to carry out one-step procedures such as remembering facts in applying conceptual knowledge to describe a phenomenon. However, UAA is still incapable in analyzing complex information or data in evaluating and interpreting data or scientific evidence at a high level of science literacy cognitive. This is in line with research (Mukharomah et al., 2021) which states that the low ability of science literacy in the domain of evaluating and designing scientific investigations and in the domain of interpreting data and evidence scientifically, is due to the fact that students are still incapable of analyzing data to draw the right conclusions and design an investigation.

The high science literacy ability of grade IV students in the competency aspect on the indicator of the ability to explain scientific phenomena and the ability to interpret data and scientific evidence is also in line with the results of the interview that students with a high category are able to explain phenomena that occur in the surrounding environment by providing arguments in accordance with the material of changing the form of objects. This is also in line with research conducted by (Ardhani et al., 2023) which states that science literacy refers to a person's ability to understand scientific concepts, ask and answer relevant questions, and draw reasonable conclusions from scientific evidence.

Science Literacy Ability in the Medium Category

ARF science literacy skills

The results of the ARF science literacy test obtained a score of 70.00 in the medium category. In terms of knowledge in the content knowledge indicator, ARF has not been able to determine the definition of the change in the form of objects and the definition of gaseous substances in question items 1 and 2. Question item number 21 on the content knowledge indicator, ARF is able to answer the question by describing the definitions of liquid and gaseous substances. In terms of procedural knowledge indicators, ARF has been able to sequence the stages of experiments on changing the form of objects from liquid to gas in the event of cooking water in question number 3 and in the epistemic knowledge indicator ARF has been able to determine examples of events that change the form of objects based on the illustrations in question items 4 and 5 and in question item number 22 ARF has been able to mention examples of melting events in their daily lives.

In terms of competence in the indicator of ability to explain scientific phenomena, ARF has not been able to answer question points 6 and 9 related to determining the definition of the event of condensing the transformation of objects and determining the involvement of a process of changing the form of objects to other objects. The ARF ability indicator to evaluate and design scientific investigations has been able to answer all questions in the indicator of evaluating and designing scientific investigations. Indicator of the ability to interpret data and evidence scientifically, ARF has not been able to analyze and interpret the properties of liquids and interpret them in the form of pictures in question number 16 and has not been able to answer question number 20 related to giving arguments about the equation of heat release and absorption. In the question item of the description of the ARF, it has not been able to explain why changes in an object can occur and has not been able to compare the changes in the shape of objects in question items 24 and 25. Based on the results of the ARF analysis, below is presented a graph of the value acquisition per indicator that has been answered as follows:

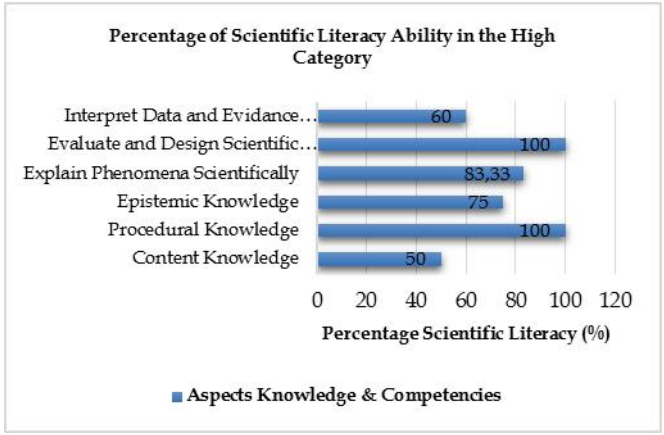

Figure 8 ARF science literacy ability

Based on the graph of the percentage of ARF science literacy ability in figure 8 above, it can be seen that the ARF is very high in the procedural knowledge indicator and the ability to evaluate and design scientific investigations and is high. In the indicator of ability to explain scientific phenomena in the high category as well as the indicator of epistemic knowledge and the ability to interpret data and evidence scientifically in the medium category and content knowledge in the very low category based on the interval of the criteria for assessing science literacy ability. Based on the results of the interview with ARF, he was able to understand the concept of material changes in the form of objects well. When asked about the definitions of liquids, solids and gases and examples, the ARF replied: "Solids have a constant volume e.g. a pen, liquids have a container-like shape e.g. water in a glass, and gaseous substances can change." This means that ARF has been able to understand the concepts of liquids, solids and gases but has not been able to mention examples of gaseous substances. This is also supported based on the results of interviews with grade IV teachers, ARF's ability to understand and remember the material is average. The ARF science literacy ability based on the test results obtained a score of 70.00 in the knowledge aspect and the competency aspect in the medium category is found in the epistemic knowledge indicator and the ability to interpret data and scientific evidence indicators. In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena including medium cognitive levels and indicators of interpreting data and evidence scientifically including high cognitive levels (OECD, 2019).

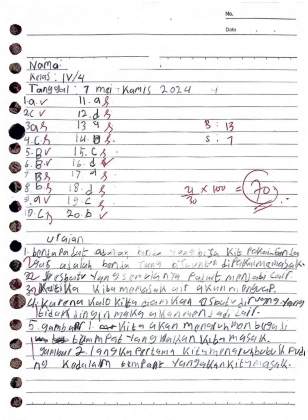

Figure 9 ARF test results

ARF students are able to describe a phenomenon and carry out one-step procedures such as remembering facts and evaluating and interpreting scientific evidence at a high level of science literacy cognitive. However, ARF students are still lacking in content knowledge indicators to understand material concepts because in the content indicators, students are more required to memorize the initial concepts. This is supported based on research (Zakaria & Rosdiana, 2018) students have not been able to master the ability to know content because there is information presented but has not been understood by students so they have not been able to process the information that has been obtained before. Further on the indicator of content knowledge according to (Sumanik et al., 2021) refers to the knowledge of facts, concepts, ideas and theories necessary to understand certain phenomena that require high memory. So that students' mastery of content knowledge depends on the ability of students to share the information they already have.

Kemamuan Literasi Sains RF

The results of the RF science literacy test obtained a score of 66.67 in the medium category. In terms of knowledge in the content knowledge indicator, ARF has been able to determine the definition of the change in the form of objects and has not been able to define gaseous substances in question items 1 and 2. Question item number 21 on the content knowledge indicator, RF has been able to answer the question by describing the definitions of liquid and gaseous substances. As an indicator of procedural knowledge, RF has been able to sequence the stages of experimenting with the change of the form of an object from liquid to gas in the event of cooking water in question number 3 and in the indicator of epistemic knowledge, RF has been able to determine one of the examples of events that change the form of objects based on the illustrations in question items number 4 and 5 and in item of question number 22 RF has not been able to mention examples of melting events in his daily life.

The competency aspect in the indicator of the ability to explain scientific phenomena, RF has been able to answer all questions correctly. The indicators of the ability to evaluate and design scientific investigations RF have not been able to answer the question items in numbers 10, 13 and 14 related to determining appropriate scientific questions based on illustrations, proposing ways to explore questions about condensation and not being able to evaluate and explain an image with scientific concepts. The indicator of the ability to interpret data and evidence scientifically RF has not been able to transform a picture into a narrative form related to the change in the form of an object in question number 15 and has not been able to issue question item number 20 related to giving an argument about the equation of heat release and absorption. In the question item of the description of RF, it has not been able to explain why changes in an object can occur and has not been able to compare the changes in the shape of objects in question number 24 and 25. Based on the results of the RF analysis, below is presented a graph of the value acquisition per indicator that has been answered as follows:

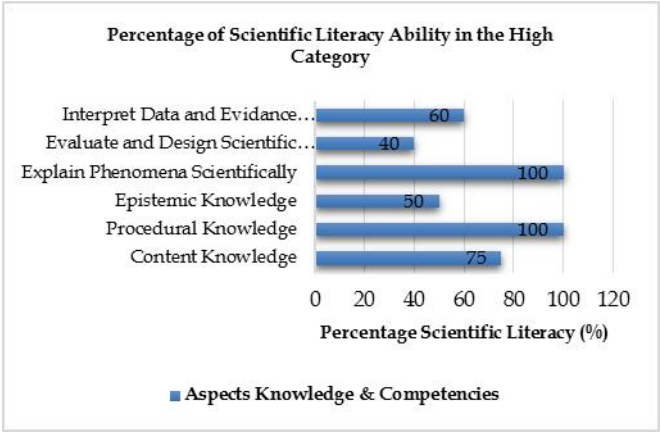

Figure 10 RF science literacy ability

Based on the graph of the percentage of RF science literacy ability in figure 10 above, it can be seen that RF is very high in the procedural knowledge indicator and the ability to explain phenomena scientifically. The content knowledge indicator and the ability to interpret data and evidence scientifically in the medium category and the very low category are attached to the epistemic knowledge indicator and the ability to evaluate and design scientific investigations. Based on the results of the interview with RF, he does not understand the concept of material changes in the form of objects well. When researchers asked about the definitions of liquids, solids and gases and examples, ARF replied that he was still confused in answering. So that the researcher alluded to the material by providing some *clues* or clues, so that the RF could only give his opinion. This means that ARF is less able to understand

the concepts of liquids, solids and gases. This is supported based on the results of interviews with grade IV teachers that RF ability does decrease slightly during grade IV both in understanding and remembering material.

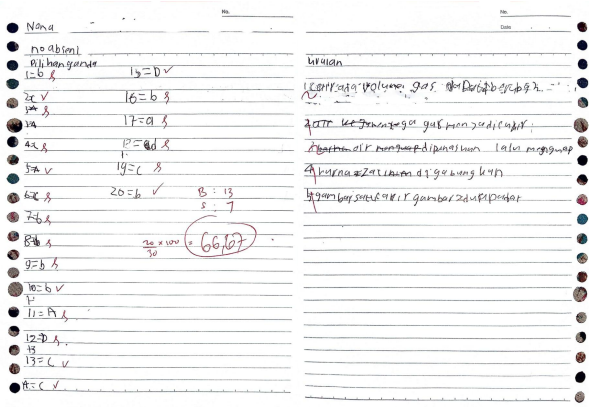

Figure 11 RF proficiency test results

RF science literacy ability based on the test results obtained a score of 66.67 in the knowledge aspect and the competency aspect in the medium category is found in the content knowledge indicator and the indicator of interpreting data and evidence scientifically. In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena including medium cognitive levels and indicators of interpreting data and evidence scientifically including high cognitive levels (OECD, 2019). RF students are able to carry out one-step procedures such as remembering facts in applying conceptual knowledge to describe a phenomenon. However, RF is not yet able to analyze complex information or data in evaluating and interpreting data or scientific evidence at a high level of science literacy cognitive. This is based on research (Irwan et al., 2019) which found that students are more controlling memorization but the ability to think to understand things in providing reasons and conclusions.

MALR Science Literacy Ability

The results of the MALR science literacy test obtained a score of 60.00 in the medium category. In terms of knowledge in the content knowledge indicator, MALR has been able to determine the definition of the change in the form of objects and has not been able to define gaseous substances in question items 1 and 2. Question item number 21 on the content knowledge indicator, MALR has not been able to answer the question by describing the definitions of liquid and gaseous substances. In terms of procedural knowledge indicators, MALR has been able to sequence the stages of experiments on the change of the form of objects from liquid to gas in the event of cooking water in question number 3 and in the epistemic knowledge indicator, MALR has been able to determine one of the examples of the event of changing the form of objects based on the illustrations in question items number 4 and 5 and in question item number 22 MALR has not been able to mention examples of melting events in their daily lives.

In terms of competence in the indicator of ability to explain scientific phenomena, MALR has not been able to answer question items 7, 8 and 9 correctly related to identifying an image related to changes in the form of objects, making predictions or hypotheses based on the phenomenon of changes in the form of objects and not being able to explain the involvement of an object with other objects. Question number 23 of MALR has been able to define and mention examples of events in the change of the form of objects in evaporation in their daily lives. The indicator of the ability to evaluate and design scientific investigations of MALR has not been able to answer the question items in numbers 12 and 14 related to evaluating how to explore various appropriate phenomena and has not been able to evaluate and explain an image with scientific concepts.

An indicator of the ability to interpret data and evidence scientifically, MALR has not been able to transform a type of image into a narrative form related to the change in the form of objects in question number 15 and has not been able to solve question item number 20 related to comparing various changes in the form of objects based on images. In question item number 24, MALR has not been able to explain why changes in an object can occur and is able to compare changes in the form of objects in question number 25. Based on the MALR science literacy percentage graph in figure 12 above, it can be seen that the MALR is very high on the procedural knowledge indicator. The indicators of the ability to evaluate and design scientific investigations and the indicators of the ability to interpret data and evidence scientifically in the medium category and in the very low category are attached to the content knowledge indicator, the epistemic knowledge indicator and the ability to explain phenomena scientifically. Based on the results of the MALR analysis, below is presented a graph of the value acquisition per indicator that has been answered as follows:

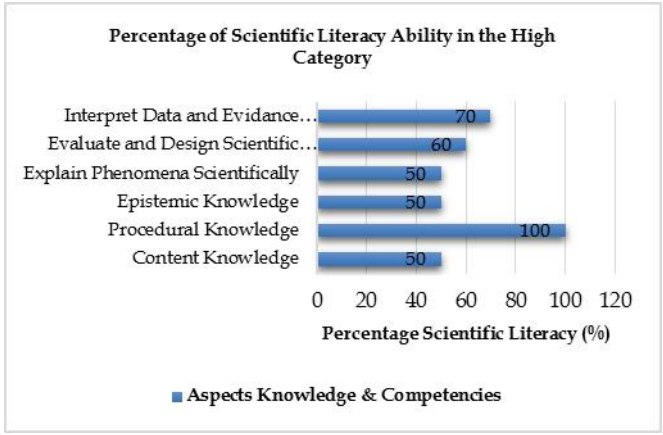

Figure 12 MALR science literacy ability

Based on the results of the interview with MALR, he has been able to understand the concept of material changes in the form of objects well. When researchers asked about the definitions of liquids, solids and gases and examples, ARF replied: "Solids have a constant volume, for example wood, liquids have a shape like a container like a sauce, and gaseous substances like air contained in a balloon". This means that MALR can understand the concepts of liquids, solids and gases. This is not synchronized based on the results of interviews with grade IV teachers who stated that MALR's ability is still lacking, but MALR is good in attitude.

Based on the results of the analysis of the three grade IV students in the medium category, ARF students are very capable in the procedural knowledge indicator, the indicator explaining scientific phenomena, and the indicator of evaluating and designing scientific investigations, but the ARF is still lacking in the content knowledge indicator, able on the epistemic knowledge indicator and the indicator of interpreting data and scientific evidence. RF students are already able to demonstrate procedural knowledge indicators and indicators of explaining scientific phenomena. However, RF is still incapable of indicators of epistemic knowledge, and indicators of the ability to evaluate and design scientific investigations. MALR students are already able to proedurally knowledge indicators, but MALR is still lacking in content knowledge indicators, epistemic knowledge and ability to explain scientific phenomena. The results of the analysis can be concluded that the three students with a medium category are found in the indicators of the ability to interpret data and scientific evidence.

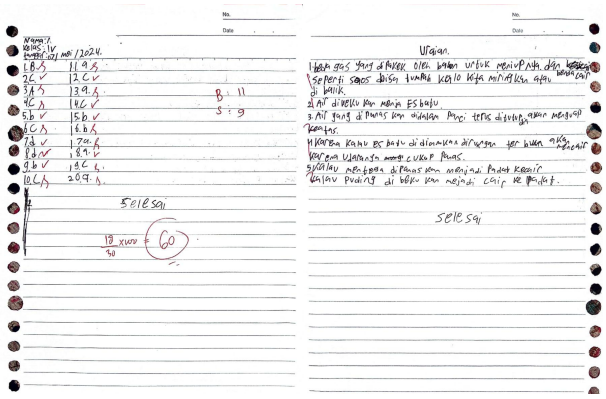

Figure 13 results of MALR capabilities

Science literacy ability based on the results of the MALR test obtained a score of 60.00 in the knowledge aspect and the competency aspect in the medium category is found in the indicator of the ability to evaluate and design investigations and the indicator of the ability to interpret scientific data and evidence. In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena including medium cognitive levels and indicators of interpreting data and evidence scientifically including high cognitive levels (OECD, 2019). This means that MALR students are able to carry out one-step procedures such as remembering facts in procedural knowledge. However, MALR has not been able to apply conceptual knowledge to describe a phenomenon and has not been able to analyze complex information or data in evaluating and interpreting data or scientific evidence at a high level of science literacy cognitive.

The science literacy ability of grade IV students in the medium category is also found in the competency aspect in the indicator of the ability to explain scientific phenomena and the ability to interpret data and scientific evidence is also in line with the results of the interview that students with the medium category are able to explain phenomena that occur in the surrounding environment by providing arguments in accordance with the material of changes in the form of objects. This is also in line with research conducted by (Ardhani et al., 2023) which states that science literacy refers to a person's ability to understand scientific concepts, ask and answer relevant questions, and draw reasonable conclusions from scientific evidence.

Science Literacy Ability of Students in the Low Category

NS science literacy ability

The results of the NS science literacy ability test obtained a score of 56.67 in the low category. In terms of knowledge in the content knowledge indicator, NS has not been able to determine the definition of the

change in the form of objects and has not been able to define gaseous substances in question items 1 and 2. Item number 21 on the content knowledge indicator, NS has been able to answer the question by describing the definitions of liquid and gaseous substances. As an indicator of procedural knowledge, NS has been able to sequence the stages of experimenting with the change of the form of objects from liquid to gas in the event of cooking water in question number 3 and in the epistemic knowledge indicator, NS has not been able to determine one of the examples of events of changing the form of objects based on the illustrations in question items number 4 and 5 and in question item number 22 NS has been able to mention examples of melting events in his daily life. The competency aspect in the indicator of the ability to explain scientific phenomena, NS has not been able to answer question items number 6, 8 and 9 correctly related to explaining one of the meanings of changing the form of objects by condensation, making predictions or hypotheses based on the phenomenon of changing the form of objects and not being able to explain the involvement of an object with other objects. Question item number 23 NS has been able to define and mention examples of events in the change of the form of objects in their daily lives. The indicator of the ability to evaluate and design scientific investigations NS has not been able to answer the question items in numbers 10, 12, 13 and 14 related to making questions based on illustrations, evaluating how to explore various events of changing the form of objects in an appropriate evaporator, not being able to propose how to explore questions about condensation and not being able to evaluate and explain an image with scientific concepts.

The indicator of the ability to interpret data and evidence scientifically NS has not been able to transform a type of image into a narrative form related to the change in the form of objects in question number 15, has not been able to solve question number 16 related to analyzing and interpreting the properties of liquids and interpreting them into the form of images and in question number 17 NS has not been able to identify things that can affect changes in the form of objects. In the description question items number 24 and 25, NS has been able to explain why changes in an object can occur and have been able to compare the events of changes in the form of objects in the image. Based on the percentage graph of NS science literacy ability in figure 14 above, it can be seen that NS is very high on the procedural knowledge indicator. Indicators of epistemic knowledge, indicators of the ability to explain phenomena scientifically and indicators of the ability to interpret data and evidence scientifically in the medium category. Based on the results of the NS analysis, below is presented a graph of the value acquisition per indicator that has been answered as follows:

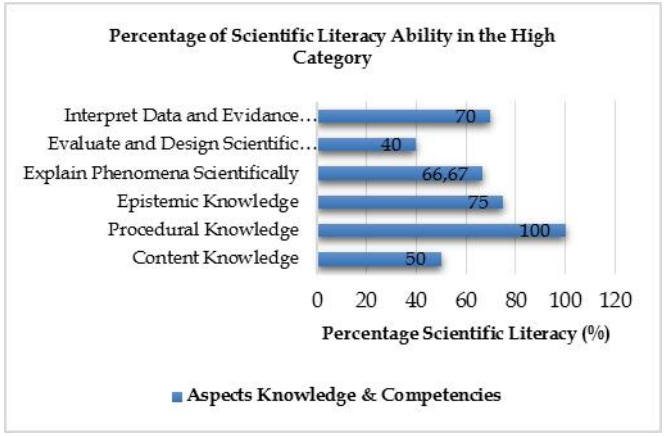

Figure 14 NS science literacy ability

The content knowledge indicator and the ability to evaluate and design scientific investigations are included in the very low category. Based on the results of the interview with NS, he has not been able to understand the concept of material changes in the form of objects well. When the researcher asked about the definitions of liquids, solids and gases and examples, NS replied: "Solid substances such as fans, liquid substances such as soy sauce, and gaseous substances such as hot air balloons". This means that NS has not been able to understand the definitions of liquids, solids and gases. This is supported based on the results of interviews with grade IV teachers who stated that NS's cognitive abilities are still lacking.

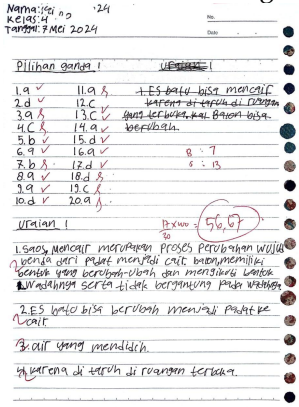

Figure 15 NS proficiency test results

Based on the results of the NS analysis in the low category, NS students are able to show procedural knowledge indicators. The average NS ability is on the procedural knowledge indicator, the ability to explain scientific phenomena indicator and the ability to interpret scientific data and evidence. NS students are very lacking in content knowledge indicators and indicators of ability to interpret data and scientific evidence. The science literacy ability of grade IV students in the low category is found in the knowledge

aspect and the competency aspect in the content knowledge indicator and the ability to explain scientific phenomena indicator. Based on the results of tests and interviews that have been conducted, students with low categories have not been able to understand the concept of science and its relevance in daily life. NS has not been able to explain the phenomenon that occurs in the surrounding environment. This is also in line with research conducted by (Vashti et al., 2020) which found that the concepts received by students do not last long, because students tend to memorize material concepts so that students guess the scientific phenomena that occur.

Students' Science Literacy Ability in the Very Low Category

MNA science literacy ability

The results of the MNA science literacy test obtained a score of 53.33 in the very low category. In terms of knowledge in the content knowledge indicator, MNA has been able to determine the definition of the change in the form of objects and has been able to define gaseous substances in question items 1 and 2. Question item number 21 on the content knowledge indicator, MNA has not been able to answer the question by describing the definitions of liquid and gaseous substances. As an indicator of procedural knowledge, MNA has not been able to sequence the stages of the experiment of changing the form of an object from liquid to gas in the event of cooking water in question number 3 and in the indicator of epistemic knowledge, MNA has been able to determine one of the examples of the event of changing the form of an object based on the illustration in question number 4 and 5 and in the description question item number 22 MNA has not been able to mention examples of melting events in their daily lives.

In terms of competence in the indicator of ability to explain scientific phenomena, MNA has not been able to answer question items number 6 and 7 correctly related to explaining the event of changing the form of objects in a condensed manner and identifying an image related to the event of changing the form of objects. Question item number 23 MNA has been able to define and mention examples of events in the change of the form of objects in a volatile manner in their daily lives. The indicators of the ability to evaluate and design scientific investigations of MNA have not been able to answer the question items in numbers 10, 11, 13 and 14 related to making questions based on illustrations, distinguishing appropriate questions related to changes in the form of objects through scientific investigation designs, not being able to propose ways to explore questions about condensation and not being able to evaluate and explain a picture with scientific concepts.

The indicator of the ability to interpret data and evidence scientifically MNA has not been able to transform a type of image into a narrative form related to the change in the form of objects in question number 15, question item number 17 MNA has not been able to identify things that can affect the change in the form of objects and has not been able to solve question item number 19 related to comparing various changes in the form of objects through images. In the description question items number 24 and 25, MNA has not been able to explain why changes in an object can occur and have not been able to compare the events of changes in the form of objects in the picture.

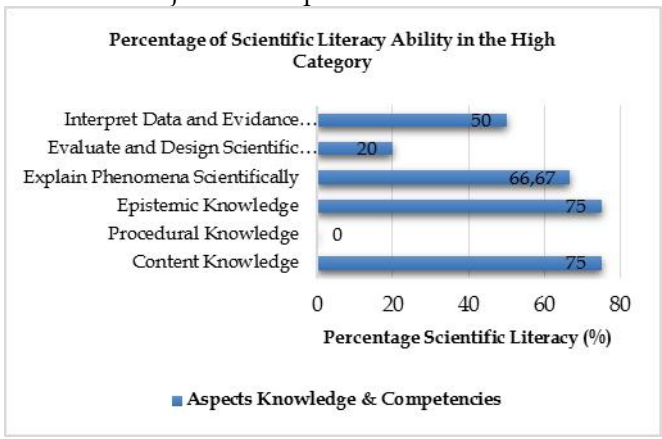

Figure 16 MNA science literacy ability

Based on the graph of the percentage of MNA science literacy ability in figure 16 above, it can be seen that MNA in the content knowledge indicator, epistemic knowledge indicator, and ability to explain phenomena scientifically are included in the medium category. Procedural knowledge indicators, indicators of the ability to evaluate and design scientific investigations and indicators of the ability to interpret data and evidence scientifically are included in the very low category. Based on the results of MNA analysis, below is presented a graph of the value acquisition per indicator that has been answered as follows: Based on the results of the interview with MNA, he has not been able to understand the concept of material changes in the form of objects well. When the researcher asked about the definitions of liquids, solids and gases and examples, the MNA replied:

"Solid substances such as books, liquid substances follow their containers, such as water in bottles, and gaseous substances such as air contained in balloons".

This means that MNA can understand the concepts of liquids, solids and gases. This is not synchronized based on the results of interviews with grade IV teachers who stated that MALR's ability is still lacking. This is also supported based on the results of MNA's very low science literacy skills. However, when interviewed, MNA was able to answer well.

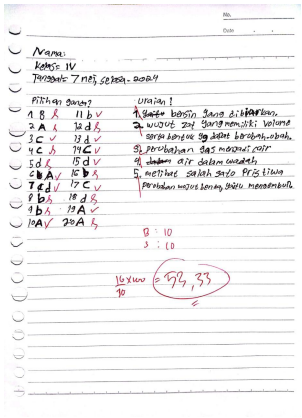

Figure 17 MNA test results

MNA's science literacy ability in the very low category is found in the indicators of procedural knowledge, indicators of the ability to evaluate and design scientific investigations and indicators of the ability to interpret data and evidence scientifically. In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena including medium cognitive levels and indicators of interpreting data and evidence scientifically including high cognitive levels (OECD, 2019). This means that MNA students are able to carry out one-step procedures such as remembering facts, terms on content knowledge. MNA has been able to apply conceptual knowledge to describe a phenomenon or interpret data. However, MNA is not able to analyze complex data information in evaluating and interpreting data or scientific evidence at a high level of science literacy cognitive.

ES Science Literacy Ability

The results of the ES science literacy test obtained a score of 50.00 in the very low category. In terms of knowledge in the content knowledge indicator, ES has been able to determine the definition of the change in the form of objects and has been able to define gaseous substances in question items 1 and 2. Item number 21 on the content knowledge indicator, ES has not been able to answer the question by describing the definitions of liquid and gaseous substances. Procedural knowledge indicators, ES has not been able to sequence the stages of the experiment of changing the form of objects from liquid to gas in the event of cooking water in question number 3 and in the epistemic knowledge indicator, ES is able to determine one of the examples of the change of object form events based on the illustrations in question items 4 and 5 and in question item 22, ES has not been able to mention examples of thawing events in his daily life.

The competency aspect in the ability indicator to explain scientific phenomena, ES has not been able to answer question number 6 related to explaining the event of changing the form of objects in a condensed manner. Question item number 23 ES has been able to define and mention examples of events in the change of the form of objects in evaporation in their daily lives. The indicator of the ability to evaluate and design ES scientific investigation has not been able to answer the question items in numbers 11, 13 and 14 related to distinguishing appropriate questions related to changes in the form of objects through scientific investigation designs, has not been able to propose ways to explore questions about condensation and has not been able to evaluate and explain an image with scientific concepts. The indicator of the ability to interpret data and evidence scientifically ES has not been able to convert a type of image into a narrative form related to the change in the form of objects in question number 15, ES has not been able to analyze and interpret the properties of liquids and interpret them in the form of images. Question item number 17 ES has not been able to identify things that can affect the change in the form of objects and has not been able to answer question number 18 related to comparing various changes in the form of objects through images. ES's ability to answer question number 20 is related to giving an argument about the equation of the release and scattering of heat. In the description question items number 24 and 25, ES has not been able to explain why changes in an object can occur and have not been able to compare the events of changes in the form of objects in the image.

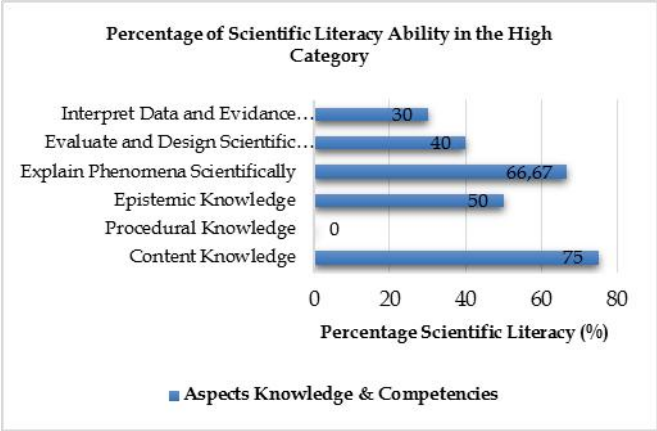

Figure 18 ES science literacy ability

Based on the graph of the percentage of ES science literacy ability in figure 18 below, it can be seen that ES on the content knowledge indicator and the ability to explain phenomena scientifically are included in the medium category. Indicators of procedural knowledge, epistemic detection, indicators of the ability to evaluate and design scientific investigations and indicators of the ability to interpret data and evidence scientifically are included in the very low category. Based on the results of the interview with ES, he does not understand the concept of material changes in the

form of objects well. When the researcher asked about the definitions of liquids, solids and gases and examples, ES was still confused in answering. So the researcher alludes to the answer to the question by providing some *clues* or clues, so that ES can give his opinion. This means that ES is less able to understand the concepts of liquids, solids and gases. This is supported based on the results of interviews with grade IV teachers that ES's ability is quite good, it's just that some clues or examples must be given that will describe a concept in a new material ES is able to understand and define.

ES science literacy ability based on test results obtained a score of 53.33 in the very low category contained in the procedural knowledge indicator, the ability to evaluate and design scientific investigations and the ability to interpret data and evidence scientifically.

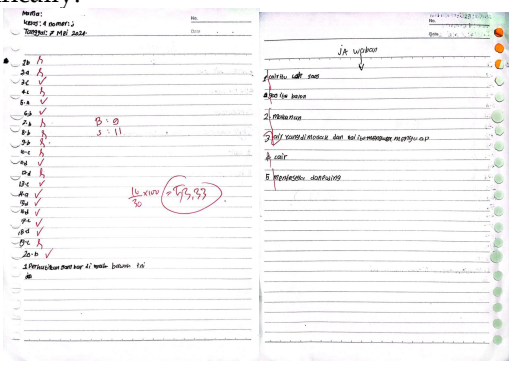

Figure 19. ES proficiency test results

In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena including medium cognitive levels and indicators of interpreting data and evidence scientifically including high cognitive levels (OECD, 2019). ES students are able to carry out one-step procedures such as remembering facts, terms in understanding material concepts in content knowledge. ES students are already able to describe a phenomenon or interpret data. However, ES has not been able to apply conceptual knowledge and the stages of analyzing complex information or data in evaluating and interpreting data or scientific evidence at a high level of science literacy cognitive.

BPHZ Science Literacy Ability

The results of the BPHZ science literacy ability test obtained a score of 50.00 in the very low category. In terms of knowledge in the content knowledge indicator, BPHZ has not been able to determine the definition of the change in the form of objects and has been able to define gaseous substances in question items 1 and 2. Item of description number 21 on the content knowledge indicator, BPHZ has not been able to answer the question by describing the definitions of liquid and gaseous substances. As an indicator of procedural knowledge, BPHZ has been able to sequence the stages of the experiment of changing the form of an object from liquid to gas in the event of cooking water in question number 3 and in the epistemic knowledge indicator, BPHZ has been able to determine one of the examples of the event of changing the form of objects based on the illustrations in question items number 4 and 5 and in question item number 22 BPHZ has not been able to mention examples of melting events in their daily lives.

The competency aspect in the indicator of ability to explain scientific phenomena, BPHZ has not been able to answer question items number 6, 8 and 9 correctly related to explaining the event of changing the form of objects in a condensed manner, making predictions or hypotheses based on the phenomenon of changing the form of objects that occur and explaining the involvement of a process of changing the form of objects to other objects. Question item number 23 BPHZ has been able to define and mention examples of events in the change of the form of objects in their daily lives. The indicators of the ability to evaluate and design scientific investigations of BPHZ have not been able to answer the question items in numbers 11, 12, 13 and 14 related to distinguishing appropriate questions related to changes in the form of objects through the design of scientific investigations, evaluating how to explore various events of changes in the form of objects in a volatile manner, not being able to propose ways to explore questions about condensation and not being able to evaluate and explain an image with the concept of scientific.

The indicator of the ability to interpret data and evidence scientifically BPHZ has not been able to convert a type of image into a narrative form related to the change in the form of objects in question number 15, question item number 16 BPHZ has not been able to analyze and interpret the properties of liquids and interpret them in the form of images and has not been able to answer question number 20 related to giving arguments about the equation of the sentence of release and absorption of heat. In the description question items number 24 and 25, BPHZ has not been able to explain why changes in an object can occur and have been able to compare the events of changes in the form of objects based on images. Based on the BPHZ science literacy percentage graph in figure 20 above, it can be seen that BPHZ is very high on the procedural knowledge indicator. Indicators of the ability to interpret data and evidence scientifically are included in the medium category. Based on the results of BPHZ analysis, below is presented a graph of the value

acquisition per indicator that has been answered as follows:

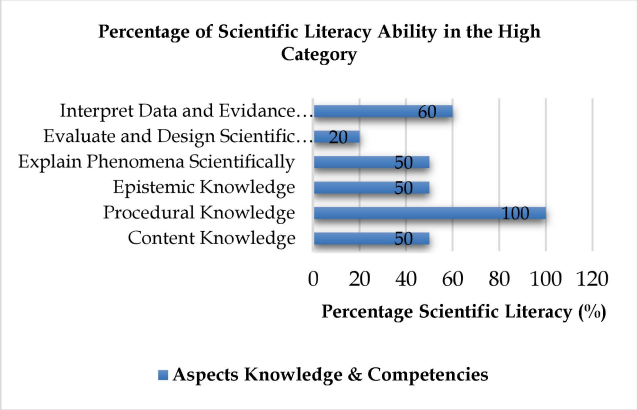

Figure 20. BPHZ capability graph

The indicators of content knowledge, epistemic knowledge, indicators of the ability to explain phenomena scientifically and indicators of the ability to evaluate and design scientific investigations are included in the very low category. Based on the results of the interview with BPHZ, he does not understand the concept of material changes in the form of objects well. When the researcher asked related to the definition of liquid, solid and gaseous substances along with examples, BPHZ was confused in answering. So that the researcher alludes to the answer to the question by providing some *clues* or clues, so that BPHZ can only give its opinion. This means that BPHZ is not able to understand the concepts of liquids, solids and gases. This is supported based on the results of interviews with grade IV teachers that BPHZ's ability is quite good, it's just that some clues or examples must be given that will describe a concept in a new material BPHZ is able to understand and define.

Based on the results of the analysis of the three grade IV students in the very low category, MNA students were able to on the indicators of content knowledge, epistemic knowledge and indicators of explaining scientific phenomena. MNA students are less able on the procedural knowledge indicators, the indicators evaluating and designing scientific investigations and the indicators of interpreting scientific data and evidence. ES students are able to explain scientific phenomena on content knowledge indicators and indicators. ES is still incapable of procedural knowledge, epistemic knowledge, and indicators of ability to evaluate and design scientific investigations as well as indicators of ability to interpret data and evidence scientifically. BPHZ students are able to demonstrate procedural knowledge and indicators of the ability to interpret data and scientific evidence. However, BPHZ is still incapable of indicators of content knowledge, epistemic knowledge, indicators of ability to explain scientific phenomena and indicators of evaluating and designing scientific investigations. The results of the analysis can be concluded that the three students with very low categories are found in the indicators of the ability to evaluate and design scientific investigations.

BPHZ's science literacy ability based on the test results obtained a score of 50.00 in the very low category contained in the procedural knowledge indicator, the ability to evaluate and design scientific investigations and the ability to interpret data and evidence scientifically. In the analysis of science literacy abilities based on the PISA framework in the cognitive dimension, indicators of procedural knowledge include low cognitive levels, indicators explaining scientific phenomena including medium cognitive levels and indicators of interpreting data and evidence scientifically including high cognitive levels (OECD, 2019).

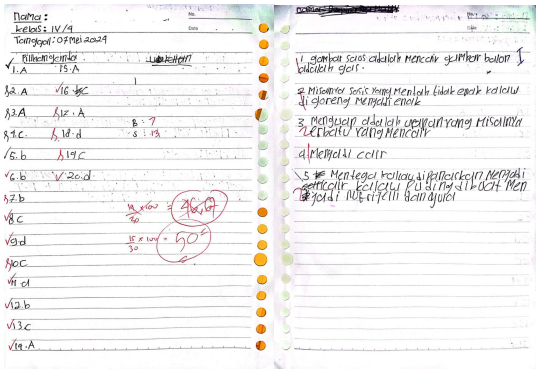

Figure 21. BPHZ ability test results

BPHZ students, meaning that they are able to carry out one-step procedures such as remembering facts in procedural knowledge. However, BPHZ students have not been able to apply conceptual knowledge to describe a phenomenon or interpret data. BPHZ students are also not able to analyze complex information or data in evaluating and interpreting data or scientific evidence at a high level of science literacy cognitive. This is in line with research conducted by (Ardhani et al., 2023) stating that science literacy refers to a person's ability to understand scientific concepts, ask and answer relevant questions, and draw reasonable conclusions from scientific evidence. The results of the analysis of the three grade IV students in the very low category based on the average of the twelve students were not able to evaluate and design scientific investigations. Students are not able to define, apply, and use conceptual knowledge to explain the steps in evaluating by designing investigations to interpret scientific data and evidence as well as in providing examples of changes in the form of liquid, solid and gaseous bodies.

Based on research (Vashti et al., 2020) it is stated that students have difficulties in answering questions related to how to evaluate and design scientific investigations due to a lack of ability to identify and explore scientific questions. Based on research (Afina et al., 2021) found that the competency aspect in the indicator of evaluating and designing scientific investigations shows the ability to propose and evaluate how to explore the questions given in an imaiah manner, and has not been able to explain and evaluate a process, so that overall students still have difficulties in evaluating and designing scientific investigations. Students in the very low category have not been able to keep up and catch up in understanding learning in the classroom. Therefore, the role of teachers in providing attention and treatment by providing remedial or learning with peer tutors so that students are able to catch up. Based on information in the study (Mukharomah et al., 2021), the cause of students' low science literacy skills refers to the learning process that has not been innovative by utilizing technology. Learning is also still racing on package books and LKS used by students during learning. Not only that, the learning environment and students' interest in exploring a deeper understanding of the material is also lacking. Therefore, efforts that can be made to improve students' science literacy skills are needed by redesigning the learning process using interactive learning by utilizing technology or by learning outside the classroom so that students can optimize scientific concepts in the surrounding environment.

Conclusion

Based on the results of the research and discussion that has been described and described, the science literacy ability of grade IV students at SDN 39 Cakranegara based on the results of the science literacy ability test in the knowledge aspect and competency aspect is categorized into very high, high, medium, low and very low criteria. The science literacy ability of grade IV students at SDN 39 Cakranegara as a whole based on the results of the science literacy ability test is in the very low category with an average of 52.27. In the aspect of knowledge and the competency aspect of students in the high category, there are indicators of the ability to explain scientific phenomena and indicators of the ability to interpret scientific data and evidence. In the medium category, there are indicators of the ability to interpret data and scientific evidence. In the low category, there are indicators of knowledge of content and indicators of the ability to evaluate scientific data and evidence, and in the very low category, there are indicators of the ability to evaluate and design scientific investigations.

Acknowledgments

Thank you to all parties involved during the process of preparing this thesis, Mr. and Mrs. lecturers who always provide guidance, advice and input, comrades in arms who have helped a lot, as well as family and themselves who always support and strengthen, the researcher would like to thank you very much.

References

Afina, D. R., Hayati, M. N., & Fatkhurrohman, M. A. (2021). Profil Capaian Kompetensi Literasi Sains Siswa SMP Negeri Kota Tegal Menggunakan PISA. *Pancasakti Science Education Journal*, *6*(1), 10–21. Https://Doi.Org/10.24905/Psej.V6i1.111

Ardhani, A. M., Wardani, I. S., & Juniarso, T. (2023). Analisis Kemampuan Literasi Sains Siswa Pada Materi Sumber Daya Alam Di Sekolah Dasar. *Jurnal Pendidikan Tambusai*, *7*(20), 21199–21207. Https://Doi.Org/Https://Doi.Org/10.31004/Jptam.V7i3.9866

Astria, F. P., Wardani, K. S. K., Nurwahidah, & Hasnawati. (2022). Analisis Kemampuan Literasi Sains (KLS) Siswa Sekolah Dasar Pada Pembelajaran Sains. *Jurnal Ilmiah Profesi Pendidikan*, *7*(4), 2744–2752. Https://Doi.Org/: Https://Doi.Org/10.29303/Jipp.V7i4b.1064

Budiwati, R., Budiarti, A., Muckromin, A., Hidayati, Y. M., & Desstya, A. (2023). Analisis Buku IPAS Kelas IV Kurikulum Merdeka Ditinjau Dari Miskonsepsi. *Jurnal Basicedu*, *7*(1), 523–534. Https://Doi.Org/Https://Doi.Org/10.31004/Basicedu.V7i1.4566 ISSN

Dwisetiarezi, D., & Fitria, Y. (2021). Analisis Kemampuan Literasi Sains Siswa Pada Pembelajaran IPA Terintegrasi Di Sekolah Dasar. *Jurnal Basicedu*, *5*(4), 1958–1967. Https://Doi.Org/Https://Doi.Org/10.31004/Basicedu.V5i4.1136 Copyright

Fuadi, H., Robbia, A. Z., Jamaluddin, & Jufri, A. W. (2020). Analisis Faktor Penyebab Rendahnya Kemampuan Literasi Sains Peserta Didik. *Jurnal Ilmiah Profesi Pendidikan*, *5*(2), 108–116.

Hidayah, N., Rusilowati, A., & Masturi, M. (2019). Analisis Profil Kemampuan Literasi Sains Siswa SMP/MTS Di Kabupaten Pati. *Phenomenon : Jurnal Pendidikan MIPA*, *9*(1), 36–47. Https://Doi.Org/10.21580/Phen.2019.9.1.3601

Irwan, A. P., Usman, & Amin, B. D. (2019). Analisis Kemampuan Literasi Sains Peserta Didik Ditinjau Dari Kemampuan Menyelesaikan Soal Fisika Di

SMAN 2 Bulukumba. *Jurnal Sains Dan Pendidikan Fisika (JSPF)*, *15*(3), 17–24. Https://Doi.Org/10.35580/Jspf.V15i3.13494

Kasse, F., & Atmojo, I. R. W. (2022). Analisis Kecakapan Abad 21 Melalui Literasi Sains Pada Siswa Sekolah Dasar. *Jurnal Education And Development*, *10 (1)*(1), 124–128. Https://Doi.Org/Https://Doi.Org/10.37081/Ed.V10i1.3322

Mukharomah, F., Wiyanto, W., & Darma Putra, N. M. (2021). Analisis Kemampuan Literasi Sains Fisika Siswa Sma Pada Materi Kinematika Gerak Lurus Di Masa Pandemi Covid-19. *Journal Of Teaching And Learning Physics*, *6*(1), 11–21. Https://Doi.Org/10.15575/Jotalp.V6i1.10391

Nasir, M., Muhamadiah, Indah, S., & Irham. (2023). Literasi Sains Siswa Melalui Model Pembelajaran Inkuiri Terbimbing. *Jurnal Ilmiah Ilmu Pendidikan*, *6*(1), 324–328. Https://Doi.Org/Https://Doi.Org/10.54371/Jiip.V6i1.1425

Nurlaili, Ilhamdi, M. L., & Astria, F. P. (2023). Analisis Kemampuan Literasi Sains Siswa Kelas V SDN 1 Sukarara Pada Pembelajaran IPA Materi Perpindahan Kalor. *Jurnal Ilmiah Profesi Pendidikan*, *8*(3). Https://Doi.Org/Https://Doi.Org/10.29303/Jipp.V8i3.1554

OECD. (2019). *PISA 2018 Assessment And Analytical Framework*. Https://Doi.Org/Https://Doi.Org/10.1787/B25efab8-En.

OECD. (2023). PISA 2022 Results The State Of Learning And Equity In Education Volume I. In *OECD Publishing: Vol. I*. Https://Doi.Org/10.31244/9783830998488

Putra, W. T. G. (2022). Asesmen Literasi Sains Tema Kimia Hijau Pada Siswa Kelas XII Di SMAN 1 Atap Lembongan. *Indonesian Journal Of Educational Development*, *3*(1), 1–15. Https://Doi.Org/10.5281/Zenodo.6557263

Sugiyono, P. D. (2019). *Metode Penelitian Pendidikan (Kuantitatif, Kualitatif, Kombinasi, R&D Dan Penelitian Pendidikan* (A. Nuryanto (Ed.); 3rd Ed.). ALFABETA.

Sumanik, N. B., Nurvitasari, E., & Siregar, L. F. (2021). Analysis Of Science Literation Abilities Profile Prospective Teachers Of Chemical Education. *Quantum: Jurnal Inovasi Pendidikan Sains*, *12*(1), 22–32. Https://Doi.Org/Http://Dx.Doi.Org/10.20527/Quantum.V12i1.10215

Vashti, T. A., Hairida, & Hadi, L. (2020). Deskripsi Literasi Sains Mata Pelajaran Ilmu Pengetahuan Alam Siswa SMP Negeri Pontianak. *Educhem*, *1*(2), 38–49. Https://Doi.Org/Http://Dx.Doi.Org/10.26418/Educhem.V1i2.41108

Zakaria, M. R., & Rosdiana, L. (2018). Profil Literasi Sains Peserta Didik Kelas VII Pada Topik Pemanasan Global. *PENSA: E-Jurnal Pendidikan Sains*, *6*(02), 170–174.