Vol. 5, No. 2 (2021) 196-207 ISSN: 2597-4866
Indonesian Journal of Primary Education

Analysis of Understanding Natural Science Concepts on Elementary School Class IV Energy Source Material

Muhammad Nanda Kusuma1, Sukardi2, Nora Surmilasari3

PGRI Palembang University1,2,3
* *Corresponding author:* nandakusuma542@gmail.com[1],sukardipgri12@gmail.com[2],Norasurmilasari@gmail.com[3]

Received 24 July 2021; Revised 31 July 2021; Accepted 28 December 2021
Published 31 December 2021

Abstract

The purpose of this study is to find out the understanding of science concepts in the fourth grade energy source material at elementary school. The research method used in this research is a quantitative description. Data collection techniques in this study were tests, interviews and documentation. The data obtained were then analyzed using percentages. The results of this study indicate that the average understanding of science concepts in the fourth grade energy source material at elementary school belongs to the moderate criteria of 49%. This is evident from the results of the study that the percentage of students' understanding of science concepts from three indicators which include: giving examples and non-examples of a concept by 39% low criteria, classifying objects according to their nature or according to the concept by 63% high criteria and assigning returned a concept by 47% of the moderate criteria.

.

Keywords:Understanding of Science Concepts, Energy Sources

PRELIMINARY

Education is all activities that are carried out consciously in the form of coaching and planned to bring changes in human beings in the learning process, students can actively develop their potential optimally. Ahmadi (2017:36). To achieve these educational goals, elementary school education (SD) is the basic level for students in taking education. At the elementary school level, students are required to master various basic subjects, namely Religion, Civics, Indonesian Language, Mathematics, Natural Sciences (IPA), Social Sciences (IPS), Cultural Arts and Crafts (SBdP), and Physical Education. Aka (2016).

Science subjects are found in elementary schools, science is a science that can be learned from the events of the universe by fostering an attitude of curiosity, observation, openness, honesty, experiments arranged in a coherent manner through precise observations and logical explanations. Astari (2018). One of the competencies that must be mastered by elementary school students in science learning is understanding the concept of a thinking activity to absorb, understand, accept and process ideas to become a meaningful learning experience. Indicators of understanding concepts based on Bloom's proposed in Astuti (2017) are:

a. Restate a concept.
b. Classify objects according to their nature or according to the concept.
c. Give examples and non examples of a concept.
d. Presenting concepts in various forms of representation.
e. Develop sufficient conditions of a concept.
f. Using, exploiting, and selecting certain procedures or operations.
g. Apply concepts or problem solving.

Based on the indicators of understanding the concept above in this study, only 3 were taken to be assessed and measured, namely restating a concept, classifying objects according to their nature or according to the

concept and giving examples and non-examples of a concept. Thabit, D. (2020).

Energy sources are one of the basic science learning materials that are studied in elementary schools. According to Alim (2020) revealed that the source of energy is something that can cause objects to do a job or something that can cause work. Something that is able to produce energy to do work in life, around our environment there are two sources of energy that cannot be renewable and renewable energy sources, energy changes, forms of energy that can be used in life.

In the midst of the COVID-19 pandemic, schools are implementing online learning through various available application platforms such as Zoom, Google Meet, Google Classroom, which are media that can be optimized. Through these electronic application media, educators can transfer knowledge and skills in learning. In addition to using typical applications for learning activities, teachers and students also usually use the WhatsApp application because it is considered easier. Andriana et. al (2020)

Based on the results of interviews with the homeroom teacher for class IV at SD Negeri 229 Palembang, the homeroom teacher for class IV stated that the learning outcomes of students in science learning in energy source materials scored below the minimum completeness criteria (KKM) of 65. Furthermore, the homeroom teacher stated that online conditions were like This makes it difficult for students to understand the material given by the homeroom teacher, especially in science material which requires students to observe, understand, and conclude, especially energy source material, it is still difficult to distinguish examples of renewable energy sources and non-renewable energy sources. , it is not correct to mention the benefits of energy in everyday life, the assignments given are always late for gathering, and the lack of interaction between teachers and students in the science learning process,have not used the model in the learning process.

Research conducted by Widiawati (2015) concludes that students' understanding of science concepts needs to be improved, because they play an important role in determining the success of learning implementation, further increasing understanding of concepts in science lessons by utilizing the surrounding environment as a learning resource.

In line with previous research, research conducted by Arsinda (2020) also examined the analysis of conceptual understanding in science learning for class V SD Negeri 204 Palembang. The results of his research concluded that all fifth grade students at SD Negeri 204 Palembang still had difficulty in understanding the concept of science material style, in the learning process the teacher did not use the media.

Research conducted by Suryani (2016: 64) concluded that understanding science concepts is very important for students because the concepts understood by students will affect the mastery of the next concept. This is because the concepts in science lessons are related to each other. Understanding the science concepts possessed by elementary students is a milestone in understanding other science concepts at the next level of education. For this reason, elementary students must have a high understanding of science concepts.

The purpose of this study was to find out the understanding of science concepts in the fourth grade energy source material at SD Negeri 229 Palembang. This research method uses quantitative descriptive to use numbers in processing test data to find out understanding of science concepts in the fourth grade energy source material at SD Negeri 229 Palembang.

RESEARCH METHODS

The object of this research is the understanding of the concepts of fourth grade students at SD Negeri 229 Palembang, while the informants in this research are fourth grade teachers and fourth grade students of SD Negeri 229 Palembang.

In this study using quantitative descriptive research methods. According to Sugiyono (2014:147) descriptive method is a statistic used to analyze data by describing or

describing the data that has been collected as it is without intending to make valid conclusions or generalizations. According to Wibowo (2014:124) Quantitative approach is a research method that applies quantification to the variables, describes the distribution of variables numerically (using absolute numbers in the form of frequencies and relative values in the form of percentages) and then tests the relationship between variables using statistical formulas. This method uses numbers in processing test data to determine understanding of science concepts in class IV energy source material at SD Negeri 229 Palembang.

The data collection technique used in this study was interviews, in addition to being conducted to determine the initial conditions or pre-research, also after the test, 2 students were selected in the high grade category, 3 students in the medium category, and 2 students in the low category to confirm the learning outcomes or the results of the participants' work. For students, the test in the form of a description is used in the form of 8 questions based on 3 indicators of understanding the concept of science on energy source material, documentation is used to list the grades of fourth grade students, sheets of student work in completing descriptions about energy source material, photos while the researcher is in SD Negeri 229 Palembang.

The data analysis technique used in this study is the percentage to determine each indicator of concept understanding and the level of understanding of students.
The following scoring formula:

NP=R/SM×100 Purwanto (2017:102)
Information:
NP = Valuepercent sought or expected
R = Scoreraw material obtained by students
SM = Scorethe ideal maximum of the test that concerned
100 =Fixed number

Table 1
Percentage Criteria

Percentage %	Criteria
0-20%	Very low
21-40%	Low
41-60%	Currently
61-80%	Tall
81-100%	Very high

Aseptianova (2019)

RESULTS AND DISCUSSION

Description of Research Results

Understanding of Science Concepts in Students Based on Percentage Criteria

The research data obtained from the test results that have been analyzed to determine the criteria for the students' understanding of the science concept test results can be seen in the following table.

Table 2
Results of Understanding Science Concepts on Students Based on Percentage Criteria

No	Criteria	Learners	Percentage
1	Very high	9	28%
2	Tall	7	22%
3	Currently	4	13%
4	Low	5	16%
5	Very low	7	22%
	Amount	32	100%

(Source: Data Processed by Researchers, 2021)

From table 2 above, the results of the research on understanding science concepts from a total of 32 students obtained the criteria for 9 students having a very high understanding of science concepts with a percentage of 28, there were 7 students having a high understanding of science concepts with a percentage of 22%, there were 4 students have a moderate understanding of science concepts with a percentage of 13%, there are 5 students who have a low understanding of science concepts with a percentage of 16%, there are 7 students who have a very low understanding of science concepts with a percentage of 22%.

Understanding of Students' Science Concepts Based on Indicators With Percentage Criteria

To find out the results of the students' understanding of science concepts based on indicators, it can be seen in the following table.

Table 3
Results of Understanding Science Concepts in Students Based on Indicators With Percentage Criteria.

No	Concept understanding indicator	Percentage	Criteria
1	Give examples and non examples of a concept	39%	Low
2	Classify objects according to their nature or according to the concept	63%	Tall
3	Reprinting a concept	47 %	Currently
	Average	49 %	Currently

(Source: Data Processed by Researchers, 2021)

In table 4.2 it can be seen that the results of the research on students' understanding of science concepts based on indicators obtained the results of 1 indicator of high concept understanding, 1 indicator of moderate concept understanding, 1 indicator of low concept understanding.

The indicator of concept understanding with a high percentage value of 63% is the second indicator, namely classifying objects according to their nature or according to the concept because students are able to explain renewable energy and non-renewable energy, types of renewable energy and examples of alternative energy correctly and precisely. Meanwhile, the indicator with a moderate percentage value of 47% is the third indicator, namely rewriting a concept because students are able to explain changes in energy that are used in daily life correctly and precisely. Meanwhile, the indicator with a low percentage value of 39% is the first indicator, namely giving examples and non-examples of a concept because students are able, but not yet in explaining the process of changing one form of energy into another form of energy. With an average understanding of science concepts that is 49%.

Research Data Analysis
Test Data

The analysis of the test data in this study was based on the results of the answers of students who got percentage scores with very high, high, medium, low and very low criteria based on indicators of understanding science concepts.

a) Indicator 1

Indicator 1 is to give examples and non-examples of a concept in questions 3 and 7.

1) The answers of students with very high criteria can be seen in the image below.

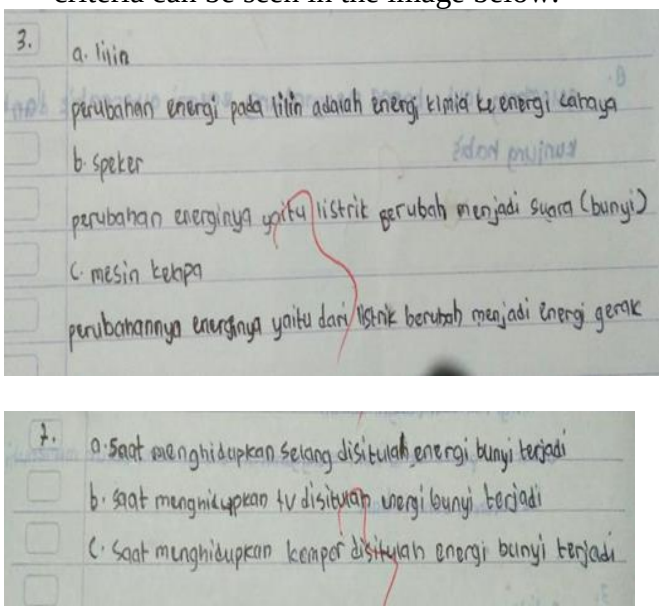


Image 1
The results of student answers with very high criteria
(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that students' answers can analyze examples of the process of changing forms of energy into other forms of energy and explain changes in forms of energy to other forms of energy correctly and precisely. There are 6 students who get very high criteria.

2) The results of students' answers with high criteria can be seen in the image below.

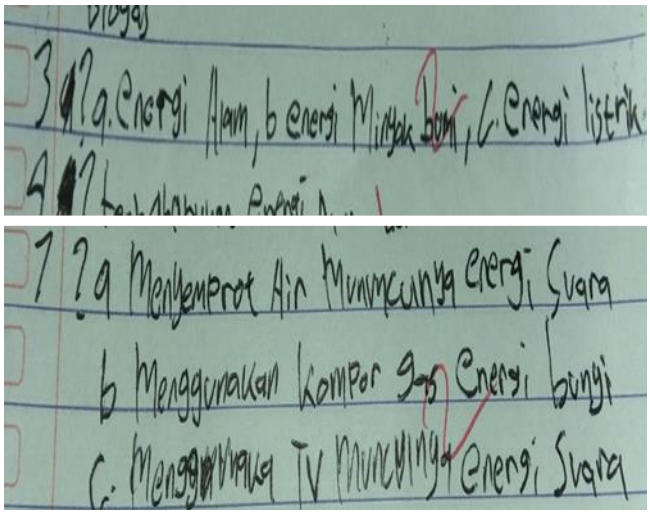


Figure 2
The results of students' answers with high criteria
(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the students' answers are able to analyze examples of the process of changing the form of energy into other forms of energy and explain the changes in the form of energy to other forms of energy correctly. There are 6 students who get high criteria.

3) The results of students' answers with moderate criteria can be seen in the image below.

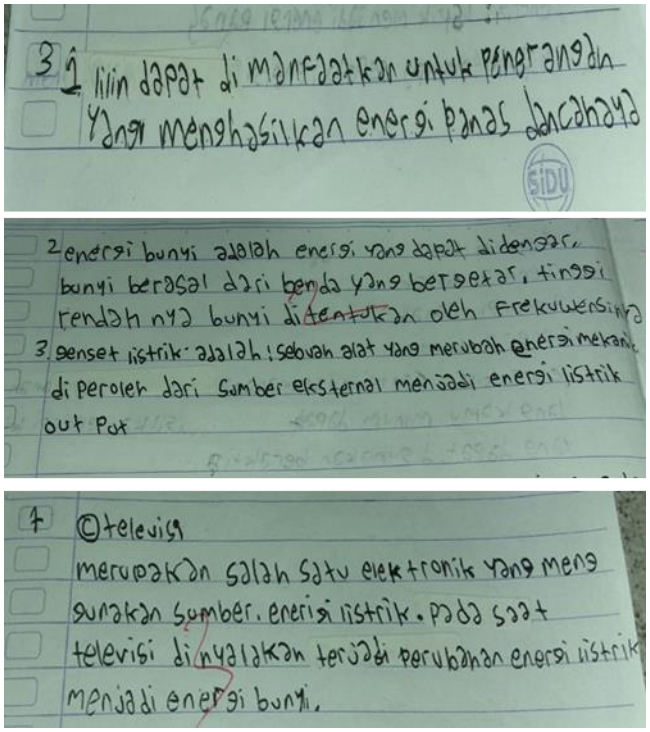


Figure 3
The results of students' answers with moderate criteria
(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the answers of the students were able, but slightly lacking in analyzing examples of the process of changing the form of energy to another form of energy and explaining the change in the form of energy to another form of energy. There are 2 students who can medium criteria.

4) The results of students' answers with low criteria can be seen in the image below.

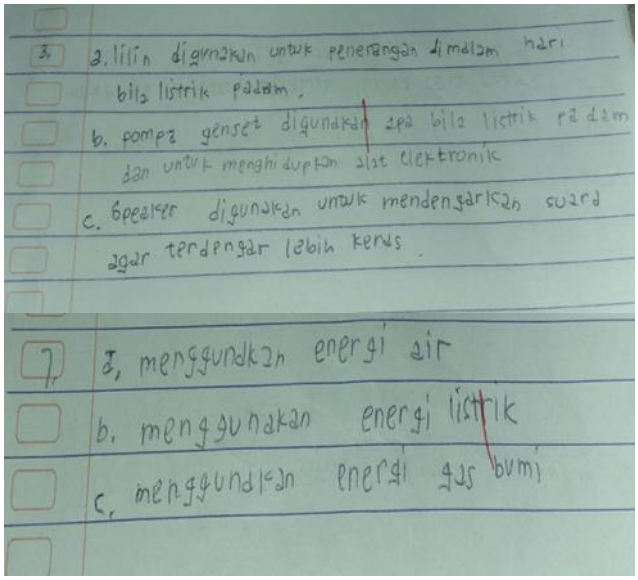


Figure 4
The results of students' answers with low criteria
(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the students' answers are able, but not appropriate, in analyzing examples of the process of changing the form of energy to other forms of energy and explaining changes in the form of energy to other forms of energy. There are 6 students who get the low criteria.

5) The results of students' answers with very low criteria can be seen in the image below.

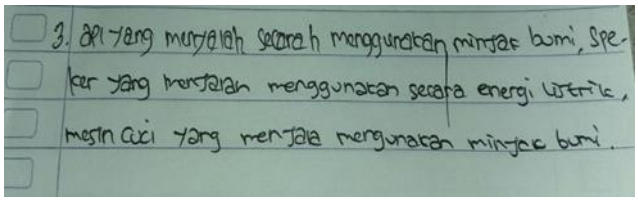


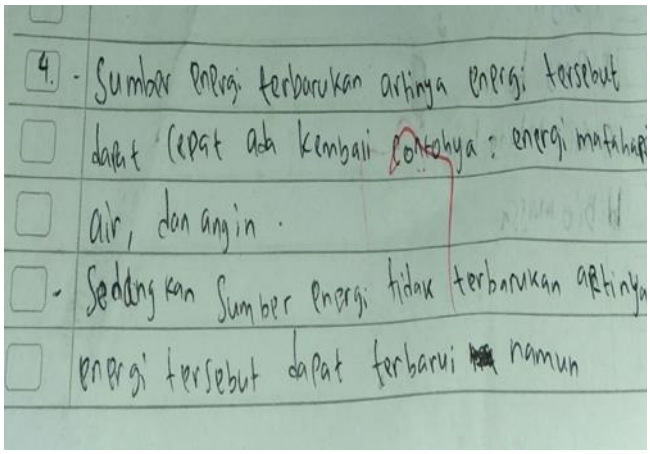
Figure 5
The results of students' answers with very low criteria
(Source: Data Processed by Researchers, 2021)

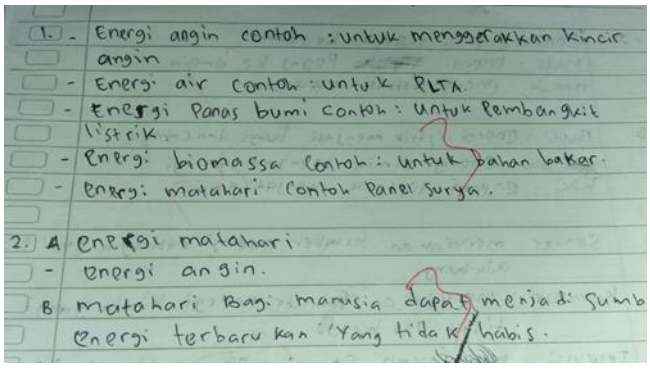
Based on the picture, it can be seen that the answers of students lack understanding in analyzing examples of the process of changing the form of energy to other forms of energy and explaining changes in the form of energy to other forms of energy. There are 12 students who get the low criteria.

b) Indicator 2

In indicator 2, namely classifying objects according to their nature or according to the concept in questions number 1, 2, 4 and 8.

1) The answers of students with very high criteria can be seen in the image below.





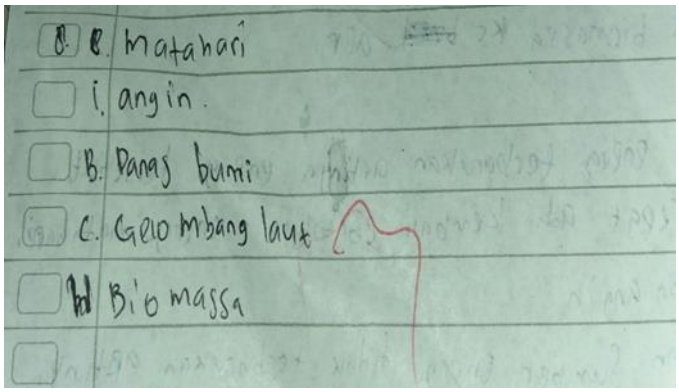
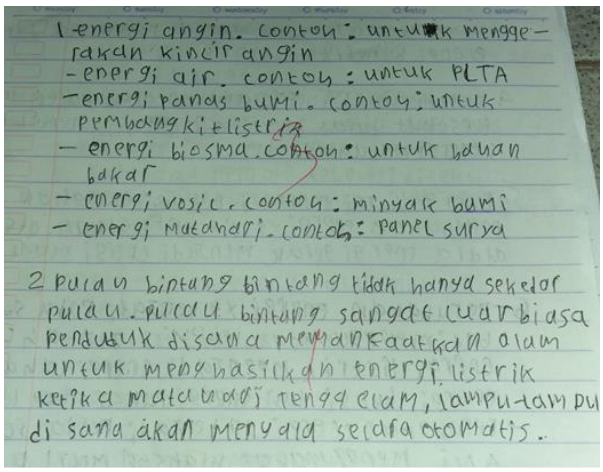


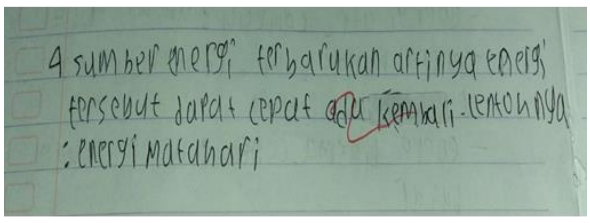
Figure 6
The results of student answers with very high criteria

(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the students' answers can mention and explain the types of objects from renewable energy sources and non-renewable energy sources. Determine which are truly examples of alternative energy sources correctly and appropriately. There are 13 students who get very high criteria.

2) The answers of students with high criteria can be seen in the image below.





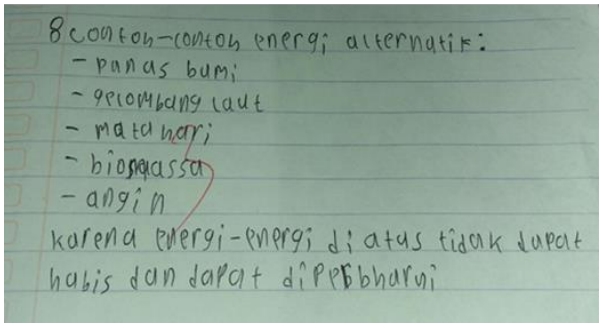
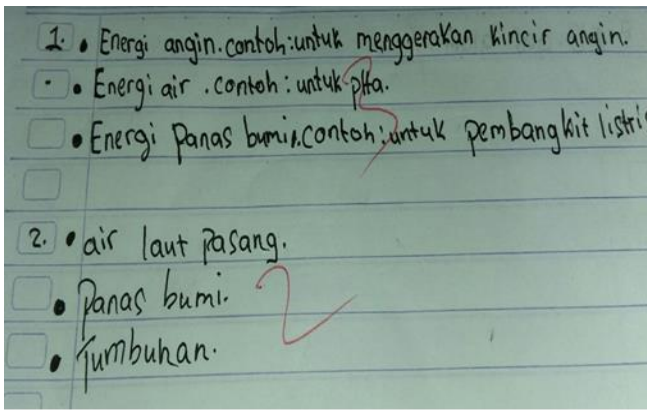


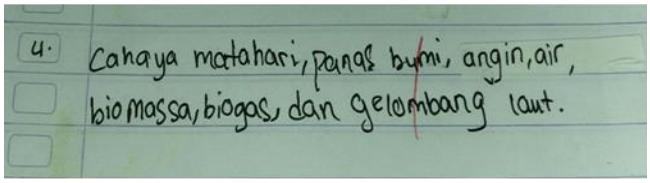
Figure 7
The results of students' answers with high criteria

(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the students' answers are able to name and explain the types of renewable energy sources and non-renewable energy sources. Determine which are really examples of alternative energy sources correctly. There are 4 students who get high criteria

3) Jawaban peserta didik dengan kriteria sedang dapat dilihat pada gambar dibawah ini.



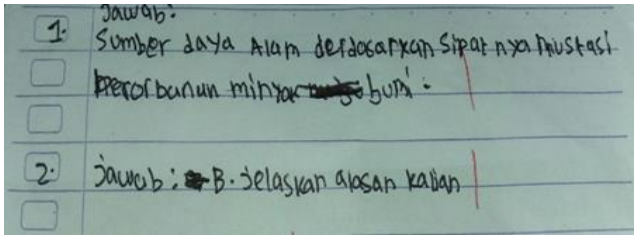


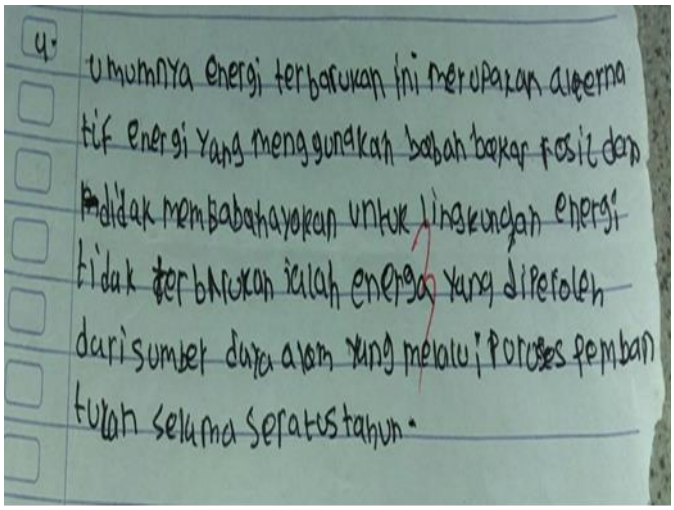
Gambar 8
Hasil jawaban peserta didik dengan kriteria sedang

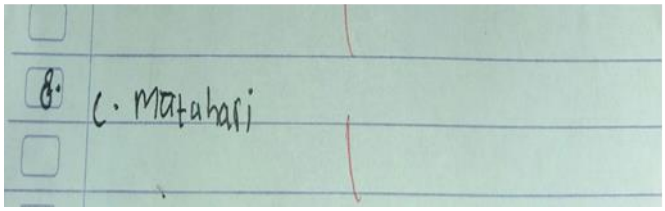
(Sumber : Data Diolah Peneliti, 2021)

Berdasarkan gambar dapat terlihat bahwa jawaban peserta didik mampu, tapi sedikit kurang dalam menyebutkan dan menjelasakan macam objek sumber energi terbarukan dan sumber energi tidak terbarukan. Menentukan yang mana benar-benar contoh sumber energi alternatife. Ada 6 peserta didik yang dapat kriteria sedang.

4) Jawaban peserta didik dengan kerteria rendah dapat dilihat pada gambar dibawah ini.







Gambar 9
Hasil jawaban peserta didik dengan kriteria rendah

(Sumber : Data Diolah Peneliti, 2021)

Based on the picture, it can be seen that the answers of the students were able, but not correct, in mentioning and explaining the

kinds of objects of renewable energy sources and non-renewable energy sources. Determine which are really examples of alternative energy sources. There are 3 students who get the low criteria.

5) The answers of students with very low criteria can be seen in the image below.

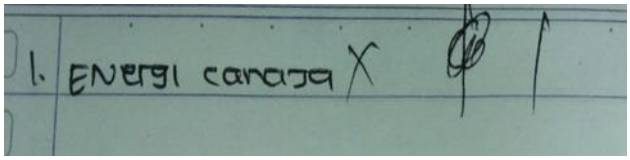


Figure 10
The results of students' answers with very low criteria
(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the answers of students do not understand in mentioning and explaining the kinds of objects of renewable energy sources and non-renewable energy sources. Determining which is really an example of alternative energy sources, there are 6 students who get very low criteria.

c) 3 indicator

In indicator 3, namely rewriting a concept in questions number 5 and 6.

1) The answers of students with very high criteria can be seen in the image below.

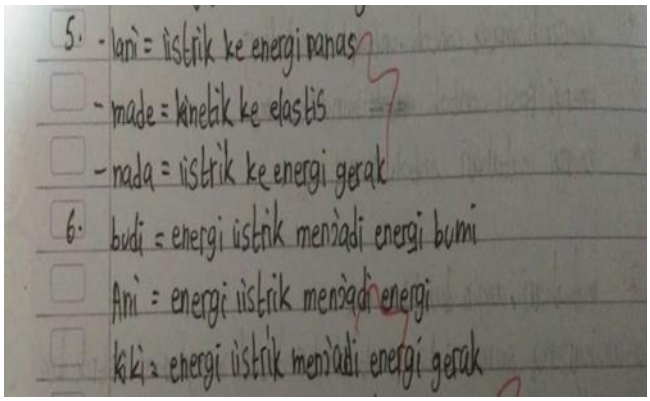


Figure 11
The results of student answers with very high criteria
(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that students' answers can analyze, state and explain changes in energy that are used in everyday life correctly and appropriately. There are 6 students who get very high criteria.

2) The answers of students with high criteria can be seen in the image below.

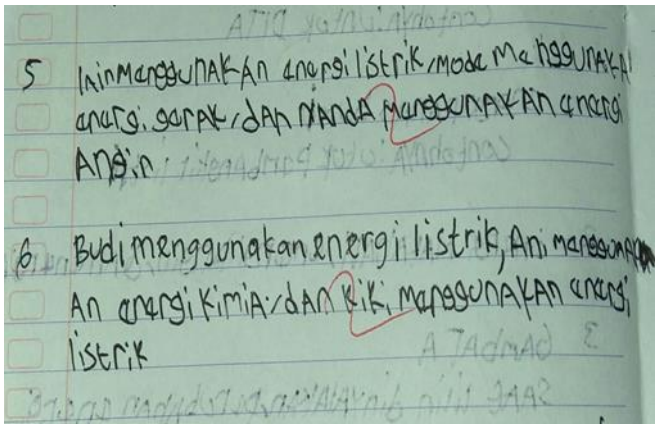


Figure 12
The results of students' answers with high criteria

(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the students' answers are able to analyze, state and explain changes in energy that are used in everyday life correctly. There are 4 students who get high criteria.

3) The answers of students with moderate criteria can be seen in the image below.

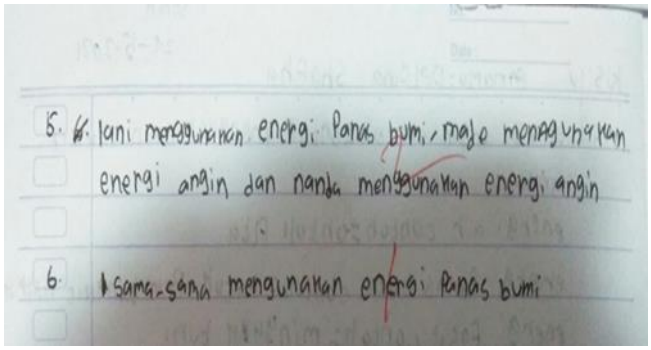


Figure 13
The results of students' answers with moderate criteria
(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the answers of the students were able, but slightly lacking in analyzing, stating and explaining the changes in energy used in everyday life. There are 9 students who get the moderate criteria.

4) The answers of students with low criteria can be seen in the image below:

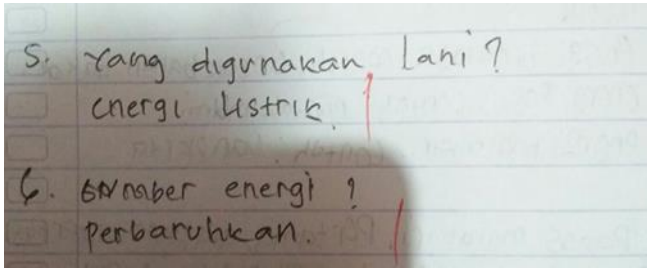


Figure 14
The results of students' answers with low criteria

(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the students' answers are able, but not yet appropriate, in analyzing, stating and explaining the changes in energy used in everyday life. There are 6 students who get the low criteria.

5) The answers of students with very low criteria can be seen in the image below

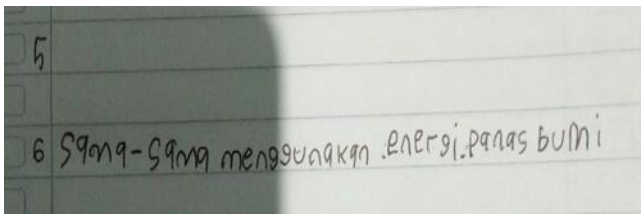


Figure 15
The results of students' answers with very low criteria
(Source: Data Processed by Researchers, 2021)

Based on the picture, it can be seen that the answers of students lack understanding in analyzing, stating and explaining changes in energy used in everyday life. There are 7 students who get very low criteria.

Interview Data

The purpose of the interview is to confirm the learning outcomes or the results of the work of students and the constraints of students in terms of answering questions that can score a percentage with the criteria of high, medium, low and very low.

a) The results of student interviews with high criteria.

Based on the results of interviews, students feel happy in learning science, especially energy source material but in the online learning process they cannot learn face to face, there are no obstacles in solving the questions given by the teacher, they understand the material presented by the teacher and the teacher uses learning Media.

b) The results of student interviews with moderate criteria.

Based on the results of interviews, students feel quite happy in learning science, especially energy source material, not optimal in the learning process because online learning cannot now learn face-to-face, there are few obstacles in solving the questions given by the teacher, it is enough to understand the material presented. by the teacher, there are not too many questions in the online learning process and the teacher uses learning media.

c) Results of student interviews with low criteria

Based on the results of interviews, students feel less happy in science learning, especially energy source material, there are obstacles in solving the questions given by the teacher because students do not understand energy source material, the online learning process now has many obstacles in understanding the material. delivered by the teacher, did not ask too many questions in the online learning process when delivering material by the teacher.

d) The results of student interviews with very low criteria

Based on the results of interviews, students feel quite boring in the online learning process, students still do not understand the energy source material, there are obstacles in

solving the questions given by the teacher because students feel they do not understand the energy source material taught by the teacher and less thorough in answering questions, not asking too many questions in the online learning process when delivering material by the teacher.

Discussion

Based on the test results that have been analyzed on each item indicator of understanding the concept of science in energy source material, there are students who have high, medium and low percentage criteria. And interviews to confirm learning outcomes or the results of students' work and the constraints of students working on questions and the learning process takes place.

a) Give examples and non examples of a concept

Based on the results of the analysis of students' understanding of concepts in the answers to test questions, each indicator provides examples and non-examples of a concept including low criteria with an average percentage of 39%. Students are able, but not yet precise in analyzing examples of the process of changing forms of energy into other forms of energy and explaining changes in energy forms to other forms of energy.

This is in line with research conducted by Arsinda (2020) with research results showing that the learning process takes place already using media but the learning process still has students who do not understand the material given by the teacher.

b) Classify objects according to their nature or according to the concept.

Based on the results of the analysis of the concept understanding of the students in the answers to the test questions, each indicator classifies objects according to their nature or according to the concept, including high criteria with an average percentage of 63%. Students are able to name and explain the kinds of objects of renewable energy sources and non-renewable energy sources. Determine which are really examples of alternative energy sources correctly.

This is in line with research conducted (Wardono, 2016) with research results showing that students are able to classify a concept based on the special characteristics of the concept presented in the form of an explanation.

c) Reprinting a concept

Based on the results of the analysis of the understanding of the concept of students in the answers to the test questions on each indicator, reiterate a concept including the moderate criteria with an average percentage of 49%. Students are able, but slightly lacking in analyzing, stating and explaining changes in energy used in everyday life.

This is in line with research conducted by Rahayu et. al (2020) the second student got a score of 87.5 because students were not careful in reading the questions so they were fooled in answering them. And the third student also got a score of 87.5 with the same error that occurred in the second student in answering the diagonal plane on the beam. In other words, because the second and third students have the same error in answering the questions given relating to indicators of restating a concept,

Based on the results of the analysis of the three indicators, it can be concluded that the understanding of science concepts in students, especially energy source material is included in the "medium" criteria with the average percentage value of achievement for each of the three indicators of 49%.

Based on the results of interviews, students who get low criteria feel less happy in learning science, especially energy source material, there are obstacles in solving the questions given by the teacher because students do not understand energy source material, the online learning process now has many obstacles - obstacles in understanding the material presented by the teacher, not asking too many questions in the online learning process when delivering material by the teacher.

Based on the results of interviews, students who get high criteria feel happy in learning science, especially energy source material but in the online learning process they cannot learn face-to-face, there are no obstacles in solving the questions given by the teacher, have understood the material presented by the

teacher. teachers and teachers use learning media.

Based on the results of interviews, under the criteria that students who get the criteria are feeling quite happy in learning science, especially energy source material, it is not optimal in the learning process because online learning cannot now learn face-to-face, there are few obstacles in solving the questions given by the teacher, it is enough understand the material presented by the teacher, do not ask too many questions in the online learning process and the teacher uses learning media.

This is in line with the research conducted by Widiawati et. al (2015) This is in accordance with the results of interviews which show that the obstacles faced by teachers and students in understanding science concepts are that teachers often use the lecture method during learning, and students still often memorize concepts taught by teachers. In addition, the obstacles faced are the lack of student interest in learning, inadequate facilities such as textbooks and teaching aids, the lack of utilizing the surrounding environment as a learning resource.

CONCLUSION

Based on the results of data analysis and discussion, the percentage of students' understanding of science concepts from three indicators includes: giving examples and non-examples of a concept by 39% low criteria, classifying objects according to their nature or according to the concept by 63% criteria high criteria and recast a concept by 47% medium criteria, then overall the average percentage of understanding science concepts is 49% moderate criteria.

BIBLIOGRAPHY

Aanggari, AS (2017). Always Save Energy. Jakarta: Center for Curriculum and Books, Balitbang, Ministry of Education and Culture.

Ahmadi, R. (2017). Introduction to Education. Yogyakarta : AR-RUZZ MEDIA.

Aka, KA (2016). Quantum Teaching Model With Cooperative Learning Approach To Improve The Quality Of PKN Learning. ISSN Journal of Pedagogy 2089-3833, Volume 5, No 1.

Alim, Z. (2020). Basic IPA. Bandung : PT Pemuda Rosdakarya.

Arsinda. (2020). Analysis of Understanding Science Concepts on Style Materials for Class V Students at SDN 204 Palembang. Palembang.

Asriyanti, DD, & Purwati, IS (2020). Factor Analysis of Learning Difficulties in terms of Mathematics Learning Outcomes of Grade V Elementary School Students. Elementary School: A Study of Educational Theory and Practice, 79-87.

Astari, FA (2018). The Effectiveness of Using Discovery Learning Models and Problem Based Learning Models on Science Learning Outcomes for Grade 2 Elementary School Students. Journal of Basicedu Vol 2 No 1, 4.

Purwanto, MN (2017:102). Teaching Evaluation. Bandung: PT Pemuda Rosdakarya, page 102

Sugiyono. (2014). Research Methods Quantitative, Qualitative and R & D. ALFABETA: Bandung.

Suryani, E. (2016, 5, (1)). Analysis of Science Concept Understanding of Elementary School Students Using TWO-TIER TEST Through Cognitive Conflict Learning. Journal Of Primary Education, Vol 5, No 1.

Thabit, D. (2020). Analysis of Understanding Social Science Concepts on Economic Activities Using Online Social Science Learning Videos in Class IV SDN Pakujajar Cdm. Journal of Basic Education, Vol 5, No 1.

Wibowo, A. (2014). Practical Research Methodology in the Health Sector . Jakarta : PT RajaGrafindo Persada.

Widiawati, NP (2015). Analysis of Concept Understanding in Science Lessons for Fourth Grade Elementary School Students in Cluster II, Banjar District. e-Journal of PGSD Ganesha University of Education, 3, (1).