

Misconception of Science Learning in Primary School Students

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Abstract: This study aims to identify misconceptions in science teaching primary school learners and the factors that influence in the Surakarta Islamic Ta'mirul Elementary School. Studies are qualitative research case study type. Subjects selected through a purposive sampling technique. The research data obtained through observation, documentation, interviews, and tests. Further analysis of the data was performed using flow analysis model. Based on the analysis and discussion, it can be obtained information that misconception occurs in all sub-concepts in science teaching materials. Percentage of misconceptions from the highest to the lowest in the motion of styles and influences in everyday life 74.8%, light and its relation to the sense of sight 74.3%, 66.7% and energy alternatives, sound and its relation to the senses of hearing 56.7%, the shape and function of the body in animals and plants 41.3%. This indicates that the misconception that occurs in science teaching fourth grade Surakarta Islamic Ta'mirul still relatively very high. The high student misconceptions in science teaching are derived from (a) the initial perception of students is wrong; (b) the teaching materials used; (c) models that are not contextual learning science.

Keywords: *science learning, misconceptions, elementary school, case studies*

INTRODUCTION

Understand constructivism proposed by Jean Piaget believed that science built on the experience of someone who has past and then is reconstructed with new knowledge that he got (Jannah, 2010). Every individual has a different experience when compared with the experience possessed by others. When someone gets a new concept, that information will recall similar information already stored in its memory. The more complete the information constructed in one's understanding of the concept, the more perfect understanding of a person in understanding a more complex event.

Milenković (2017: 1) states that through this construction process, information and understanding of a person to be embedded very strong and tends to be difficult to remove. It would be a major problem in the construction process if a person fails to incorporate some of the phenomena into a true information and following the scientific concept. The failure of the construction process is what causes someone having misconceptions.

Learning science at the primary school level is more focused on the cultivation of basic concepts. The basic concept into a major foothold for students to develop their knowledge on a higher level of thinking and complex. Create scientific products is the highest level to be achieved in Science Learning. The creation of scientific products that are beneficial to human life is one of the benefits offered by science teaching. It was also made by Lakshmi in Trianto (2010: 137) which states that the theory of Science Learning will give birth to technologies that can provide convenience for life.

But on the other hand, these benefits would not be obtained by the learner if he had misconceptions. Understanding the concept that one has made it difficult for students to develop the knowledge to create scientific products. Prolonged misconception would be a concern and discussion are important for Indonesia who has aspirations to become a developed country with

good technology development. When learners become the next generation to this day still experiencing misconception, the aspiration to become a developed country that can develop products that are useful scientific and technology will be difficult to materialize.

Natural Sciences in learning in primary schools into one branch of science that has a high level of difficulty to understand. As one part of the charge of teaching in primary schools, the Natural Sciences has a lot of the concepts used to describe a wide range of phenomena. Science Learning concepts embodied in many abstracts. In this regard, Abbas (2016: 83) affirms that the mastery of a concept that is abstract necessarily has a higher level of difficulty when compared with the control concrete concept.

The complexity of the science material which is accompanied by the use of abstract concepts learners makes it difficult to understand the material being studied. The phenomenon is evidenced by the results of the study Program for International Student Assessment (PISA) in 2016 which states that Indonesia is ranked 62 out of 72 other countries in science. Based on these research results Indonesia is still far behind Singapore, which at the time was ranked first and beat the educational system of Europe, North and South America (Berlianto, 2016).

Learners at the elementary school level are still in the concrete operational stage. Abstract concepts in science teaching primary school learners would make it difficult to understand the material being studied. Based on the theory suggested by adherents to understand constructivism, Narjaikaew (2013: 252) states if the students failed in the past to construct his experience with the new concept contained in Science Learning, the learner may be subject to misconceptions.

One concept that must be understood learners fourth grade at the Payload science learning according to Thematic Books Class IV Scene 7 Curriculum 2013 were electrical and magnetic materials. The material electrical circuit is one of the materials in science teaching in the branch of physics that deals with the activities of daily life. However, in practice, the electric material is a material that is quite difficult to understand learners. Similar feelings were expressed in the research results Pesman and Eryilmaz (2010: 216), who said that as many as 69% of the 124 learners experiencing misconceptions of electrical circuit material.

In addition to the disciplines of physics, biology branch misconceptions can also be found in some materials. One material in branches of biology that has a great chance happen misconceptions contained in material adjustments to the environment of living creatures made by Maier, Wolf, & Randler (2016: 91) states that 19.7% of students experiencing misconceptions about the material. Misconceptions experienced by learners are found in sub discussion of adaptation, both adaptation physiology, morphology, and behavior.

Errors or misconceptions concepts also occurred in the disciplines of Chemistry. Abstract concepts contained in the disciplines of Chemistry allows learners to experience misconceptions on some material that has a high difficulty level. The statement was strengthened with the research conducted by Mutlu & cent (2014: 634), who said that 151 Turkish Science Teachers experiencing misconceptions on the concept of chemical elements.

The misconception is that it is difficult to identify. Learners who have not the same misconceptions learners who do not understand the concept. If students do not understand the concept, then after the teacher gives a good explanation through learning, students will be able to understand the concept. However, if the students had misconceptions, even with a good description, students will remain difficult to accept the concept correctly. It was mentioned also by Berg (1991) which states that misconception would be difficult to remove even with high-quality lectures.

Therefore, to minimize the risks mentioned above, the need for a deeper study of misconceptions about science teaching in primary school students and the factors that influence it. This study focuses on the identification of the material misconception fourth-grade science curriculum, 2013. The study aims to identify misconceptions of learning science and describe the factors that influence in the Surakarta Islamic Ta'mirul Elementary School.

METHOD

This research is classified in qualitative research with case study method. Starman and Biba (2013) state that a case study is a form of qualitative research that combines the phenomenological approach, interpretive paradigm, and constructivism to reveal significant facts thoroughly and by the purpose of research. The research was conducted in the second semester of 2018/2019 with 30 learners research object fourth grade in elementary Ta'mirul Islam, Surakarta, Central Java, Indonesia. Determining the object of research is done using a purposive sampling technique. Purposive sampling is a sampling technique research resources with particular considerations (Sugiyono, 2016). The reason for selecting SD Ta'mirul Islam as a sample in this research is the Elementary School is one school that has average high learning outcomes. This is evidenced by the many achievements and championships earned SD Ta'mirul in various competitions every year. Furthermore, the school gives permission and very cooperative in supporting this research.

Data collected by observation, documentation, interviews, and tests. Observations carried out during the learning takes place in the classroom. Documentation is done through an analysis of the value of Deuteronomy Central Semester (UTS) and Deuteronomy Final (UAS), a book teacher and student books used in teaching and learning other devices that are used as a reference in learning. Interviews were conducted with teachers and students of class IV. Implementation of the test to identify the misconceptions of learning science is done by giving 20 items with the Two-tier Test form. Preparation of matter based on the material contained in the Basic Competency (KD) in the fourth-grade curriculum, 2013.

Prior tested to students, a matter that is contained in the two-tier test has been validated by two lecturers. Two-tier test that has to validate accompanied by grating the questions and the assessment rubric. Two-tier instrument multiple-choice diagnostic test particularly two main sections on every item you see. The first level consists of a conventional multiple-choice selection of answers to the questions posed, the second level comprises an open revealing description of the possible reasons why the answer was given to the first level.

For this study, 30 questions, each of which represents an indicator. As for the assessment of test instruments, the range of scores for each question that is between 1 and 4. Students receive a score of 4 if they can explain the events with the correct, complete and systematic. A score of 3, if students can explain the events correctly and completely. A score of 2, if the student can explain the events correctly. Score 1, students can explain but incorrect.

Data validation techniques using triangulation techniques on methods, resources, as well as theory. Moleong (2005) revealed that triangulation is a technique to examine the validity of the data that utilizes a variety of sources with different methods and theories to check or comparison of data. Furthermore, the technique of data analysis using flow models with the following stages: (1) data reduction; (2) The presentation of data; (3) conclude.

RESULTS

Basic competence as measured in this study consisted of 5 KD, namely KD 3.1 to analyze the relationship between form and function in the body parts of animals and plants; KD 3.3 to identify various styles, among others: muscle force, electric force, magnetic force, gravity, and friction; KD 3.4 connects style with a motion on the events in the surrounding environment; KD 3.5 identify various sources of energy, transformation of energy and alternative energy sources (wind, water, solar, geothermal, biofuel, and nuclear) in everyday life; KD 3.6 apply the properties of sound and its relation with the sense of hearing; KD 3.7 apply the properties of light and its relation to the sense of sight. Through the Basic Competency, then more simply Teaching science to students in the fourth-grade curriculum in 2013 can be grouped into five sub material, ie material form and function of the body in animals and plants, style, energy and alternatives, the properties of sound.

Tests conducted referring to the grille and the assessment rubric matter. The results of the diagnostic test misconceptions science teaching can be seen in Table 1.

Table 1. Results of Diagnostic Tests misconception Science Lesson Grade IV

No.	interval Value	Frequency
1.	21-30	1
2.	31 - 40	2
3.	41-50	12
4.	51-60	7
5.	61-70	7
6.	71-80	1
The number of students		30
Total Value		1630
Average Class		54.30

Based on the analysis of Table 1, the low value of these tests indicates that misconceptions fourth-grade students in learning science is still very high. The average test which only stood at 54.30 is still very far from the school a minimum completeness criteria that have been set for the fourth grade, which is 70. In the implementation of this diagnostic test is only one student whose value is above the KKM. Also, only 16 of the 30 students, or about 40% of the total number of students who value greater than the average grade, and 18 students, or about 60% of students have a value below the class average. This suggests that the fourth-grade students misconception Ta'miril Islam Surakarta in learning science is still relatively very high.

Table 2. Score Misconceptions Students Each Sub Material Content Science Learning

Matter	Maximum score	score misconceptions	Percentage (%)
Form and function of body parts of animals and plants (5)	150	62	41.3
Style (7)	210	157	74.8
And alternative energy (4)	120	80	66.7
The properties of sound (7)	210	119	56.7
The properties of light (7)	210	156	74.3

Based on Table 2, then obtained more detailed data about the misconceptions of students per sub-materials in science teaching fourth grade. Sub-sub-style materials are materials that have the highest levels of misconceptions. In these tests, 5 items represent indicators of achievement of competencies (GPA) in KD KD 3.3 and 3.4. Sub material properties of light occupy the second-highest level of misconceptions. Test on the sub-material nature of light, 7 items represent indicators of achievement of competencies (GPA) in KD 3.7. Then, followed by sub-materials and alternative energy was measured using four items that represent indicators of achievement of competencies (GPA) in KD 3.5. Furthermore, there are sub material properties of sound is measured using seven items that represent indicators of achievement of competencies (GPA) in KD 3.6.

DISCUSSION

The scientific concept of learners is very diverse, so too alternative concepts or misconceptions that accompany it. Misconceptions in Science Learning Materials Sub-class IV in the curriculum in 2013 is shown in Table 3 below.

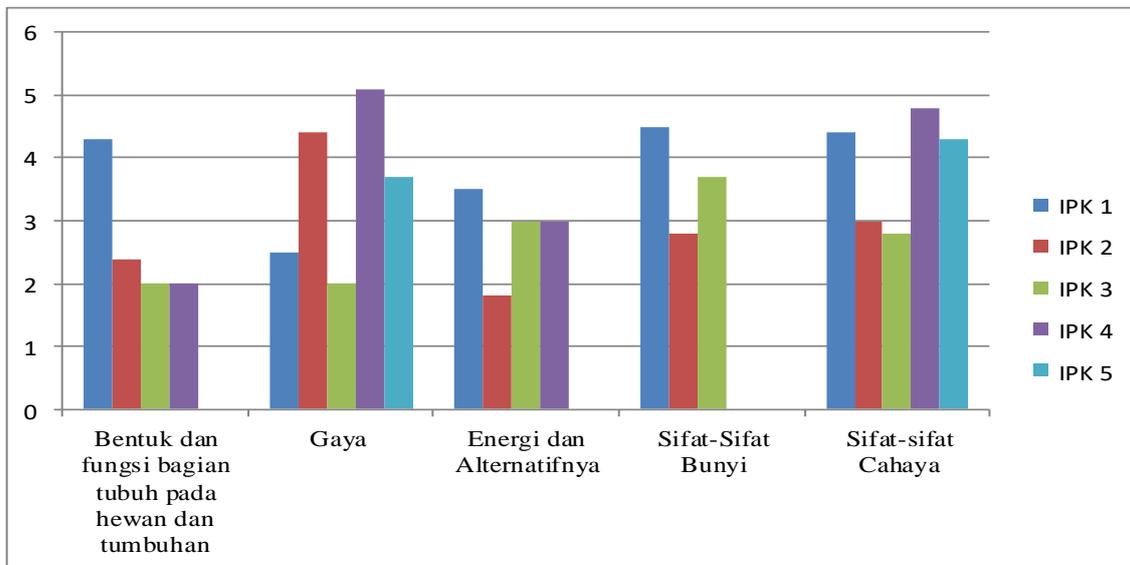


Figure 1. Profile misconceptions science teaching Class IV

Misconceptions in Science Learning as measured in this study were KD 3.3 identify various styles, among others: muscle force, electric force, magnetic force, gravity, and friction; KD 3.4 connects style with a motion on the events in the surrounding environment; KD 3.5 identify various sources of energy, transformation of energy and alternative energy sources (wind, water, solar, geothermal, biofuel, and nuclear) in everyday life; KD 3.6 apply the properties of sound and its relation with the sense of hearing; KD 3.7 apply the properties of light and its relation to the sense of sight.

Table 3. Material misconceptions Forces on Gravity Style Competency Achievement Indicators

type misconceptions	Percentage %
No forces are acting on stationary objects	17.8
The magnitude of the gravitational force acting on each different object	
Objects with a heavier mass will fall faster than lighter objects with masses	27.87
The dropping of the higher elevations will remain a long fall quickly if it has a heavier mass	20.6
Objects with the different cross-sectional area, but with the same mass would fall equally fast	22.8

Gravity Style Problem I:

Style is the pull and push. Styles can make stationary objects into moving. A student stood up on stage and do not do any movement at all. The style of whether that works on the students themselves?

- a. No force is working
- b. Gravity alone style
- c. Gravity alone
- d. Gravity, weight and normal force

What is the reason you choose that answer?

The question aims to determine students' understanding of the concept of style on stationary objects. In this matter none of the students who answered correctly. All students assume that no forces are acting on stationary objects.

Answer students with misconceptions:

A moving object is an object that is subject to force, either pull or push. Stationary objects remain in position so that the object did not have the pull or push. Therefore there is no force acting on stationary objects.

Gravity Style Problem II:

Rifki weighs 65 kg, while Banu weighs 75 kg. Rifki and Banu will jump into the pool from a wooden board height 5 meters together. Who is subject to the force of gravity is greater?

- a. Rifki subjected to the force of gravity is greater
- b. Banu subjected to force greater gravitas
- c. Rifki and Banu subjected to gravity at large
- d. Nothing was subjected to force of gravity

What is the reason you choose that answer?

The question aims to determine students' understanding of the magnitude of the force of gravity is constant. Some students were able to give a reason for the answer with scientific reasons and by the right concept. However, most students have not been able to outline the reasons for the existing scientific concepts. Comparison between student students understand the concepts and students who have misconceptions as follows:

Answer students with the scientific concept:

A large force of gravity on Earth is always the same. Although objects with a heavier mass have gravity down larger, the object also has a normal force equal to the top with gravity.

Answer students with misconceptions:

To be able to move and fall to the bottom, then a larger object with mass to be towed by a larger force as well. Then the force of gravity to pull objects falling should be greater

Gravity Style Problem III:

Alif has a rubber ball and a metal ball. When crossing the bridge, she accidentally dropped both simultaneously from the top of the bridge with a height of 3 meters. Which will be the first to land?

- a. Iron balls will fall and touch the first hold
- b. Rubber balls will fall and hit the ground first
- c. Which certainly can not fall to the ground first
- d. Iron balls and marbles will hit the ground simultaneously

What is the reason you choose that answer?

The question aims to determine students' understanding of the effect of body mass on the speed of falling objects. Just as in the problem of gravity, some students were able to give a reason for the answer with scientific reasons and by the right concept. However, most students have not been able to outline the reasons for the existing scientific concepts. Comparison between student answers students understand the concepts and students who have misconceptions as follows:

Answer students with the scientific concept:

Free-falling objects are not affected by the masses but are affected by distance or height of the object when dropped. The higher the initial position of the object before it is dropped, then the length of the path that must be taken also such objects to fall to the ground.

Answer students with misconceptions:

Objects falling speed is not affected by the altitude but influenced by the mass of the object. The more the weight of an object then the sooner he fell touching the ground.

Problem Style Gravity IV:

Diva has marbles mass of 2 g and 5 g. If the marble is dropped together, but marbles with a mass of 2 g were dropped from a height of 1 m and marbles with a mass of 5 g dropped from a height of 3m. Objects if that would hit the ground first?

- a. Both bodies will fall together*
- b. It is not certain what the object is going to fall first*
- c. Marbles mass 2 g*
- d. Marbles mass 5 g*

What is the reason you choose that answer?

The question aims to determine students' understanding of the effect of distance on the speed of falling objects. Just as in the problem of gravity, some students were able to give a reason for the answer with scientific reasons and by the right concept. However, most students have not been able to outline the reasons for the existing scientific concepts. Comparison between student answers students understand the concepts and students who have misconceptions as follows:

Answer students with the scientific concept:

Free-falling objects are not affected by the masses but are affected by distance or height of the object when dropped. The higher the initial position of the object before it is dropped, then the length of the path that must be taken also such objects to fall to the ground.

Answer students with misconceptions:

Objects falling speed is not affected by the altitude but influenced by the mass of the object. The more the weight of an object then the sooner he fell touching the ground.

Gravity Style Problem V:

Zulfi has two sheets of paper VHS with the same size and mass. One paper he Remat to be a ball of paper, and one other paper he let it remain shaped sheet. The second paper by Zulfi dropped simultaneously from the same height. Which paper would hit the ground first?.

- a. paper ball*
- b. paper sheets*
- c. Both hit the ground simultaneously*
- d. Which can not be determined more quickly*

What is the reason you choose that answer?

The question aims to determine students' understanding of the influence of the cross-sectional area at a speed of objects falling objects. Some students were able to give a reason for the answer with scientific reasons and by the right concept. However, most students have not been able to outline the reasons for the existing scientific concepts.

Table 4. Material misconceptions force on Competency Achievement Indicators Swipe Style

type misconceptions	Percentage %
Bicycles are running will stop instantly when pedaling a bicycle released force causes moving objects because, when the force is removed then the body will immediately stop	35.6
Bicycles are running will still have the same speed when pedaling a bicycle released, because the bike was not on the brakes so that no frictional force	35.8
Bicycles are running will increase the speed at released bicycle pedaling, because the bike was not on the brakes so that no frictional force	27.45

Swipe Style Problem I:

Dea going to school by bicycle. He cycled so that the bike sped fast enough. At one point he tried to break its stroke but without the brake. What will happen to the rate of the bike?

- a. Bicycles will progress faster*
- b. Bicycles will be moving at the same speed*
- c. Bike the longer it will slow down and eventually stop*
- d. Bicycles will immediately stop*

What is the reason you choose that answer?

The question aims to determine students' understanding of the concept of the influence of the frictional force. Some students already know the concept of the influence of the frictional force. But many of the others are still having misconceptions about the concept. Many students assume that the bike will accelerate at the same speed as the bike does not get friction forces because the bike is not braking.

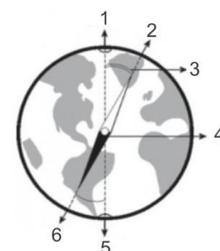
Table 5. Material misconceptions Style the Competency Achievement Indicators Style Magnet

type misconceptions	Percentage %
Earth's Magnetic north is located in the northern part of the earth so that the north pole of a compass also points north earth	17.8
Magnet is located in the southern hemisphere, and vice versa, so that the north pole of a compass needle pointing towards the southern hemisphere, for the polar namesake will not pull	27.87

Magnet Style Problem I:

Earth's magnetic south pole and the north pole of a compass needle row indicated by the numbers...

- a. 5 and 2*
- b. 6 and 2*
- c. 5 and 1*
- d. 1 and 2*



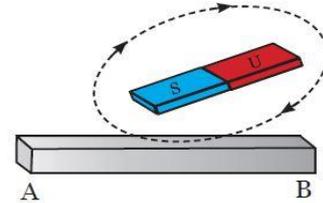
What is the reason you choose that answer?

The question aims to determine students' understanding of the Earth's magnetic source. In this matter none of the students who answered correctly. All students assume that no forces are acting on stationary objects.

Problem Style Magnet II:

Based on the picture above, how to manufacture magnets and poles are generated is...

- a. Rubbing, A = South, B = North
- b. Rubbing, A = North, B = South
- c. Induction, A = South, B = North
- d. Induction, A = Utara, B = South



What is the reason you choose that answer?

The question aims to determine students' understanding of the manufacture of magnets by rubbing. Some students were able to give a reason for the answer with scientific reasons and by the right concept. However, most students have not been able to outline the reasons for the existing scientific concepts. Comparison between student students understand the concepts and students who have misconceptions as follows:

Table 6. Creative Sound misconceptions

type misconceptions	Percentage
The direction of propagation of the sound by the direction of the wind that blows	27.45%
Rapid propagation of sound in air medium faster when compared to solid and liquid medium	17.8%
The sound can only be heard by people who deliberately concentrating hear the sound	27.87%

Gravity Style Problem I:

Nanda and Salsa stood face to face and exchange stories. At the time Nanda told him, listen to good Salsa. When the wind blows to the left, then when Nanda told him, to which direction the sound will propagate so that it can be heard by Salsa

- a. Right
- b. Left
- c. On
- d. in all directions



What is the reason you choose that answer?

The question aims to determine students' understanding of the concept direction of the propagation of sound. In this matter, some students answered correctly. However, many students are still the wrong answer to this question.

Sound Problem II:

When after school when the teachers and students have left the classroom, a classroom wall clock fell to the floor. If no one becomes a listener when the clock falls, then what happens is...

- a. At the time of fall, clocks do not produce noise and produce no vibrations*
- b. At the time of fall, clocks do not produce sound but still produce vibrations*
- c. At the time of fall clocks still, produce sound and vibration*
- d. At the time of fall clocks still produces sound but does not produce genera*

What is the reason you choose that answer?

The question aims to determine students' understanding of the formation of the sound source. Some students were able to give a reason for the answer with scientific reasons and by the right concept. However, most students have not been able to outline the reasons for the existing scientific concepts.

Gravity Style Problem III:

At a music concert performances, Doni role as drummer. He beat his drum to accompany Gea performing a song. Who can hear the sound of drums Doni?

- a. Only Doni and Gea*
- b. Only Doni and spectators*
- c. only Audience*
- d. Doni, Gea, Spectator*

What is the reason you choose that answer?

The question aims to determine students' understanding of the concept of hearing a sound. In the mastery of this concept, many children who already understand the concept. However, some students have not been able to outline the reasons for the existing scientific concepts. Some students think that you can listen to the sound source is only the audience, because the sound can only be heard by someone who deliberately wants to listen to the sound.

Based on the analysis of students' answers on a misconception of the above, it can be concluded that the majority of the fourth-grade students are still having misconceptions in Science Learning avg with different percentages. Misconceptions experienced by learners have largely seen in the selection of answers less logical reasons and not systematic. Similar results were obtained in the research results Fajri (2016) which states that some students did not reply to the elements of unity, coherence or grievance, and use words that are not appropriate.

Another reason the error analysis results identifying the students' answers in the test has been done is the misconception that students do not understand how to explain the reason for each answer option that has been selected. This is supported by the results of the interview a few students who stated, "I did not write down the reasons the answer because I do not know why these events may occur". Research Novitasari (2016) also showed that students have difficulty in deciphering the answer to the problem description. Furthermore, he explained that the students only used to memorize the answers from a matter of course, so he had trouble when he was asked to explain in more detail. Other than that,

Analysis of the students' answers errors are not a systematic form of answers and answer students gave no reason as described above, which is caused by students who are not accustomed to the matter-shaped open description. Students are more accustomed to filling a matter that serves a selection of answers and requires students to respond briefly as a matter of limited descriptions shaped brief description. This is supported by the results of the interview a few students who stated, "I do not like to be given about the description, because I often find it

difficult to explain the answer", and "Our teachers rarely use descriptions of daily tests, only in the replay midterm or repeat end half, so we were not used to filling in about a description. "

This is supported by interviews with fourth-grade teacher Surakarta Islamic Ta'mirul stating, "When do the daily tests, usually I just use questions with multiple choice type. But occasionally I also use a form about a brief description. But I have never been made about the type of two-tier like this. "Later, the teacher added:" Sample questions freely description that I use is "List 3 examples ...", "Explain the meaning ...", "What are the benefits of ... "and many more. Based on the statements that have been submitted by fourth-grade teacher Islam Ta'mirul it can be concluded that the teachers are not accustomed students to answer questions with criteria analysis of High Order Thinking Skills. Teachers simply accustomed to using multiple choice with low cognitive taxonomy and no matter the description that requires students to analyze the issues presented in these matters. MCQs are usually used by teachers only requires students to memorize, not to hone students' thinking skills. Habits students fill multiple choice questions and a brief description of this resulted in students not being able to develop their answers to the description of free/open. This is why the students have misconceptions when they are confronted with problems that are applicable and with the criteria of High Order Thinking Skills. This is supported by the opinion Yusnia &

Based on observations during a discussion group on the learning process, it was found that students had difficulty answering questions such as two-tier. This is evident when the students tried to answer the question, some of which are still open notebook. Also, the misconceptions students may evidence when the student answers that is not logically based on the initial perception of their own. Other facts show that students prefer to complain of such a difficult task to the teacher and then copy the results of his work. This is supported by interviews several students stated, "It's just hard once, I gave up doing it", "Friends of my seatmate was a smart kid, so I copy the answer."

Analysis of the students' answers errors such as the existence of misconceptions students. One kind of answer students with the highest percentage in the sound propagation material is sound waves propagate only in the direction of the listener or follow the wind direction. When asked about the problem of the propagation of sound researchers, students respond with the answer felt sure of the answer. However, when the students were given follow-up questions regarding the process of hearing a sound that is still associated with sound propagation process, students who claim that sound only propagates toward the listener or move to follow the wind direction students become confused and give answers that are getting away with scientific concepts. This indicates that students have misconceptions about materials science in the fourth-grade primary school.

Research Silva & Almeida (2017) showed that students in both groups of experiments have misconceptions about material science. Misconceptions that occur in learners arising from learning that only use the memorization method. Teachers do not use contextual learning model so that students do not get to experience it directly. Learning presented by the teacher becomes meaningless. It makes room for students to develop their thoughts blocked so that the interest and activity of students are not growing. This is supported by the opinion of Kurt et al. (2013) which states that the use of conventional models if not interpreted correctly by students can lead to misconceptions on learning materials. Similar feelings were expressed by Malikah et al.

Another factor that can cause students had misconceptions are teachers who do not understand and master the material. This is supported by several studies that claim that many primary school teachers who have misconceptions. Research Lieu (2014) states that the number of teachers experienced a misconception on the concept of Science Learning. Dzulfikar research

results and Vitantri (2017) indicate that their misconceptions of mathematics at primary school teachers who predominantly caused by pre-conception of teachers themselves. Bayuni, Sopandi & Sujana (2018) also states that factor away from the teachers themselves is the dominant cause of miscounsel learner. Zwiep's research results (2008) also showed that most teachers are aware of their misconceptions, but do not understand the impact on their teaching. These misconceptions elementary school teachers could be facilitated by the use of various facilities and infrastructures, instructional media, and facilities that support learning to achieve its objectives. This is supported by research Koray et al. (2007) who studied the effect of teaching methods in the laboratory-based on critical and creative thinking skills to improve processes and academic achievement of primary school teachers in pre-position. The results of these studies indicate that the process skills and academic achievement of elementary school teachers in the experimental group with learning lab/practicum more successful than the control group. This is supported by research Koray et al. (2007) who studied the effect of teaching methods in the laboratory-based on critical and creative thinking skills to improve processes and academic achievement of primary school teachers in pre-position. The results of these studies indicate that the process skills and academic achievement of elementary school teachers in the experimental group with learning lab/practicum more successful than the control group. This is supported by research Koray et al. (2007) who studied the effect of teaching methods in the laboratory-based on critical and creative thinking skills to improve processes and academic achievement of primary school teachers in pre-position. The results of these studies indicate that the process skills and academic achievement of elementary school teachers in the experimental group with learning lab/practicum more successful than the control group.

Based on observations in the fourth grade Ta'mirul Islam Surakarta is known that the teachers still do not engage students in the learning process. Teachers dominant using the direct learning model in every lesson. Teachers simply use the book in teaching. Teachers write on the blackboard teaching materials, and then the students copy it. After writing on the blackboard, the teacher just sits waiting for students to copy. Learning is not effective because of the level of students' writing speed is different. As a result, the learning continues when all the students have finished copying. This causes a condition not conducive classroom because some students who have finished copying out of focus crowded own, and chat with friends. After writing, the students listen to the teacher lecture about the material. Then the material continued to dictate the students by referring to textbooks. Students complained that too much writing, and feel tired. Learning is not efficient because teachers have to repeat the words because some students can not hear clearly.

This resulted in fewer students are allowed to discover and build knowledge itself. Students are more quiet and passive listeners during the learning process. Teachers dominate classroom activities to make students as objects rather than subjects in the learning activities. As a result, students become static, passive, and are not motivated to participate in learning. This is evidenced by the differences in student motivation at the beginning and end of the lesson, students tend to be active and look very motivated to learn, but when the teacher goes into the material motivation of students getting lower, and many complain. This is certainly less developing critical thinking skills as students are not allowed to issue an opinion on learning this way.

Based on interviews with fourth grade teacher, the obtained information, among others: (a) teachers often use direct instructional model with lectures, discussions, and rarely do experiments directly; (B) occasional teachers use collaborative learning model as simple as a picture and picture or learning together on learning and just do it about 2-3 times a week

learning; (C) Teachers have always used models quiz team to submit questions for the students; (D) the reason teachers do not often use innovative learning model is an innovative model that requires long preparation and teachers are learning with innovative learning model that makes the learning process becomes less than the maximum.

Fourth-grade teacher Ta'mirul Surakarta Islamic learning, often using media such as books only. This is supported by interviews with classroom teachers V which states, "The book has many advantages, including a book, can provide complete, easy to carry and use." The students also expressed the intensity of teachers in the use of the book, "While providing materials, teachers usually reading books and dictate. Students are required to copy in the book and asked all students to read and understand books on specific subjects. "

The use of media such as books is not fully effective in learning. Sometimes there is a book that uses language for students unfamiliar, complex, and difficult to understand. Not all students can digest what is written in the book that can lead to misconceptions. Galvin, Simmie & O'Grady (2015) states that the misconceptions in the literature as the textbook is the source of a strong misconception that causes problems such as simplification and generalization of the concept of overload, lack of clarity of the concept, and no precise analogy. According to Kose, Pekel & Hasenekoglu (2009), if the book is the only source of information about teachers, it can lead to misconceptions. This resulted in the lack of accuracy of the students' knowledge.

Teacher's ability to deliver a material also affects the level of student misconceptions. This is shown by research Saracaloglu & Yilmaz (2011) which states that the ability of lower primary school teachers primarily on their critical thinking skills. Limitations of teachers in presenting the material can be minimized with the use of instructional media. Instructional media can optimize the process of transfer of knowledge from teachers to students effectively and efficiently. This is in line with the opinions Sadiman (2011) who argued that the media is anything that can be used to deliver a message from the sender to the receiver so that it can stimulate the mind, feelings, concerns, and interests as well as the student's attention in a way that learning occurs. This is supported by research results Suhandi (2017) which showed that visual multimedia used in the study can concretize abstract concepts, shows the difficult thing displayed on the students, as well as reducing misconceptions. The research result Daly et al. (2016) also showed that the use of animation can reduce misconceptions students, as well as research results Kusumaningrum Ashadi & Indiyanti (2018) which shows a cartoon concept can diagnose and reduce misconceptions students.

CONCLUSION

Based on the analysis of research and discussion, it can be concluded that the percentage of misconceptions from the highest to the lowest in the motion of styles and influences in everyday life 74.8%, light and its relation to the sense of sight 74.3%, energy and alternatives 66 , 7%, the sound and its relation to the senses of hearing 56.7%, the shape and function of the body in animals and plants 41.3%. This indicates that the misconception that occurs in science teaching fourth grade Surakarta Islamic Ta'mirul still relatively very high.

Low critical thinking skills that are caused by the fault of students in answering test questions. The analysis of student errors, among others: (a) the students' answers are not systematic; (b) students only summarize the matter was then made answer; (c) any misconceptions. It is caused by (a) learning model used by teachers dominant direct instructional model with the lecture method; (b) students are not familiar with the issue of the description; (c) students do not understand the problem and solution strategies; (d) teachers do

not understand the material, less expert in presenting the material, and only use the book as a source of information and delivery of content. Thus, it can be concluded that the critical thinking skills students of class V SD Ta'mirul Islam Surakarta are still relatively very low.

Based on the problem and the results of the analysis of the discussion conducted, the researcher recommends: (1) Teacher must be able to identify students' misconceptions as early as possible (2) Teacher should design learning with the right approach, strategy, model, and media to minimize the existence of misconception.

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