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Correlation between Achievement Motivation and Reading Comprehension Ability through Science Literacy to High School Students

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ABSTRACT

The research is to know the relationship between achievement motivation (X1), and reading comprehension ability (X2) with science literacy ability of high school students (Y). The data is all students of class X SMA Negeri 9 Jakarta. Based on data analysis can be known coefficient correlation between X1 with Y is 0,326 correlation coefficient between X2 with Y is 0,392 and correlation coefficient between X2and X1with Y is 0,601. The motivation of pace, and the ability to read the students understanding contribute 36,1% to the literacy ability of high school students.

Keywords: Achievement motivation, critical thinking, reading comprehension, science literacy

INTRODUCTION

In general, educational products that are expected are students who have the ability to adapt in the real world, can think critically and creatively, take a role as a problem solver, and decision makers. The ability can be obtained through the science he studied. Through science students are expected to develop the ability of analytical thinking inductive and deductive in solving problems related to the events around it. Means also able to apply the concepts or facts that learned in school in everyday life. This is what literate means to science or science literacy. The meaning of the word literate according KBBI is good at reading and writing. The literal meaning of science is literally the ability to read and write science.

The students' literacy skills can be measured, even with international standards. Through the Program of International Student Assessment (PISA), The Organization for Economic Co-operation and Development (OECD) monitors the results of the science literacy of students every 3 years. These results show the strengths and weaknesses of each country's education system. These results can also be used as information to assist education providers in improving the efficiency and effectiveness of the education system. The PISA 2015 results for science literacy, Indonesia ranked 62 out of 72 PISA member countries with a score of 403 (level 1) of the highest score above 669 at level 6 (OECD, 2015). The low ratings indicate the lack of science skills of Indonesian students.

The lack of literacy of Indonesian students 'science according to the analysis of Literacy Team of Puspendik science in 2004 is caused by: (1) Composition of students' answers indicating weak understanding of students on the basic concepts of science that actually have been taught, so they are not able to apply it to menginterpetasi data, explain causal relations , and solve simple problems though; (2) Weak ability of students in reading and interpreting data in reading and interpreting data in the form of drawings, tables, diagrams and other presentation forms; (3) The limited ability of students to express thoughts in writing; (4) The

students' reading accuracy is still low, the students are not accustomed to connect the information in the text to answer the questions; (5) The ability of scientific reasoning is still low; (6) Weak mastery of students to the basic concepts of science and its relation to daily life and health (Mahyuddin, 2007).

In science learning, especially biology, students can not: (1) Show some abstract and complex concepts; (2) Understand the concept and process of science; (3) Systematic way of finding out about nature; (4) The mastery of a collection of knowledge in the form of facts, concepts, or principles; (5) Undertake a process of discovery as well as prospects for further development in applying it in daily life. This indicates a low student's critical thinking ability. (Tismi Dipalaya, 2016). Though the ability to think is very important in learning in school. Marzano says: "Thingking as the foundation of schooling" (Marzano et al., 1988).

Literacy of students' science is inseparable from reading ability. To arrive at a high level of science literacy requires high-level reading skills. Recognizing the reading ability of Indonesian students surveyed by PISA in 2015, which is still low (Appendix 35), which is ranked 64 out of 70 countries (OECD, 2015), it is necessary to require reading comprehension as a ladder to achieve higher reading abilities.

Another important factor affecting science literacy is students' attitudes toward science. In PISA 2006, students' attitudes toward science include support for science, confidence, interest in science, and environmental responsibility. In the analysis, investigated more deeply among them is the students' motivation to learn science. All responses from the questionnaire of motivation are positively correlated with the scores of science abilities. Students with high motivation will have high ability scores. Students who score great in science tests tend to have a more positive attitude toward science (Ekohariadi, 2009).

The above description shows that science literacy for students is very important. Because the science literacy of students in Indonesia is still low then it needs to be improved. So some important factors associated with the acquisition of science literacy such as achievement motivation and ability to read comprehension. PISA applied to 15 year old students. Means the students who attend high school. The low literacy of science in Indonesia means low literacy of high school students in particular. Because this is done research to obtain a description of the relationship of achievement motivation and ability to read understanding of the level of literacy ability of high school students.

Reading is a process of obtaining information and understanding. Reading requires concentration, vocabulary mastery, and the ability to understand reading text information. It is included in the nature of reading comprehension. Reading comprehension teaches students to understand the information contained in the text. The ability to read comprehension is influenced by factors that come from within and from outside the reader. Factors that exist within the reader include linguistic abilities (interest), interest (reader's readiness to read), and reading ability (how well readers can read). Factors from outside the reader include reading elements and the reader environment. Elements of reading include the language of the text (the difficulty of reading material) and the organization of the text (in the form of chapters and sections, compositions, etc.). The reading environment includes the preparation of teachers before, during, or after reading lessons to help students understand the text, the way pupils respond to tasks and the general atmosphere of task completion (barriers, impulses) (Noviasih, 2014).

Understanding involves remembering information from texts, excavating themes, engaging in higher-order thinking, constructing mental images of texts, and the structure of textual understanding. The best way to build students' understanding of the

text is through modeling and thinking, guided exercise, direct instruction, and independent practice. Understanding strategies include predicting, questioning, summarizing, improving reading comprehension. Optimal understanding is measured by literal, inferential, metacognitive, vocabulary, decoding, problem solving, cooperative learning and self-esteem skills (Ness, 2011).

The concept of reading comprehension is 2 dimension: listening and word decoding process. There have been identified students with poor decoding but with good listening comprehension and students who have good decoding skills but poor listening comprehension. Bad decoders have difficulty decompilating letters and words so that the meaning is less clear, can not group words into meaningful bigger. Children with good decoding skills and poor hearing comprehension have language difficulties that impede reading comprehension. Targeted and coherent text can improve reading comprehension (Woolley, 2010). Reading comprehension is the process of making meaning from the text. Aims to gain an overall understanding of what is described in the text (Woolley, 2011).

Based on the above phrases it can be concluded that reading comprehension is a process of simultaneous excavation and development of meaning, is the process of acquiring an understanding of the ideas of the manuscript, and is the process of reconstructing the message contained in the text that is read. The ability to read comprehension is the ability of a person to reconstruct the message contained in the text that is read by connecting the knowledge possessed to understand the main idea, important details, and the whole understanding and remember the material read. Understanding is the essence of reading, based on cognitive perspective, is a reading process that emphasizes a set of strategies. The reading comprehension depends on the student's age or grade level.

Literacy of science (scientific literacy) is defined as the ability to use scientific knowledge to understand and make decisions related to natural and social events. Literacy of science also relates to an understanding of the environment, health, economy and other problems faced by modern society. The three dimensions of PISA developed in scientific literature are scientific concepts, scientific processes, scientific situations and areas of application. In the measurement there are three dimensions defined PISA, namely content, process and context of science applications (Rustaman, 2003).

Someone who has the ability of science and technology literacy is someone who has the ability to solve problems by using the concepts of science, knowing and using and maintaining existing technology products in the vicinity, creative in making simplified technology results so as to make decisions based on community values and culture local. Basically literacy of science includes two main competencies. First, longlife education. Second, the competence in using the knowledge possessed to meet the needs of his life that is influenced by the development of science and society. Literacy of science can also be defined as the ability to read and write about science and technology (Toharudin et al., 2011).

Scientific text is texts that contained test model, exploration, and hypothesis in them and are an important part of science literacy. Text in which there is science and the application of scientific papers to everyday problems. Text that demonstrates the use of human science in commercial activities, for example high-quality life-focused trade text. The text of a work of scientists depicting interest in science, demonstrates scientific thinking habits such as perseverance and curiosity, collaboration, enthusiasm and responsibility. Literacy of science is achieved when students acquire knowledge and are fluent in practicing in life. Science literacy can be taught explicitly through teacher instruction by knowing, acting, reading, writing the scientist's knowledge in the texts used (Douglas, 2006).

According to some of the definitions disclosed above, it can be concluded that science literacy is achieved when students are fluent in practicing the knowledge gained from scientific texts in life. Science literacy can be explicitly taught through learning by knowing, acting, reading and writing. Literacy of science can be interpreted as the ability to apply the concepts of science in solving everyday problems. And the traits that a person has in science literacy when using the concepts of science, hypotheses, theories and values in making responsible decisions in everyday life. So basically science literacy includes two main competencies. First, longlife education. Second, the competence in using the knowledge possessed to meet the needs of his life that is influenced by the development of science and society.

The results of Luh Gede Risa Handayani's research indicate that: there are contributions related to students' attitudes, students' perceptions of science learning process and students' learning motivation toward science literacy (Handayani at al., 2015).

The results of this study indicate that people who have high achievement motivation will easily choose tasks that are somewhat difficult or difficult, they are more likely to try relatively difficult tasks and show better performance because of their strong pride and hope, compared to those with low achievement. So the relationship between research variables shows that between achievement motivation and academic achievement, and academic achievement and between creative thinking and academic performance, there is a positive relationship (Weisani, 2013).

The results of this study indicate that an increase in motivation will result in better reading comprehension. Understanding reading is a learning aspect that can not be ignored and read is a basic and vital part of the learning process of almost every level of education. A high correlation between reading comprehension and motivation is an indication that motivation for learning has an important impact on academic success. So the study shows that between motivation and reading comprehension indicates a strong relationship (Knoll, 2000).

Based on the above explanation of the research objectives is to know the relationship of achievement motivation level with the level of science literacy ability of grade X high school students. Knowing the relationship of reading comprehension ability with the level of science literacy ability of grade X high school students. Knowing the relationship of achievement motivation and reading comprehension ability with science literacy skill level of grade X high school students.

METHOD

This research uses quantitative approach with correlational descriptive research type. The population in this study are students class X SMA Negeri 9 Jakarta, amounting to 252 students. Sampling technique in this research, that is random sampling. Determination of the sample size using Slovin formula with the error rate α = 5%, of the population 252 then the sample used is 155 students.

Instrument of data collection for motivation of parsing questionnaire, critical thinking ability using essay problem, ability to read comprehension using multiple choice problem and ability of science literacy use essay problem.

This study analyzed the correlation between motivation of presentation (X1) with students' science literacy ability (Y), with literacy ability of student science (Y), relation between reading comprehension ability (X2) with student science literacy ability (Y) motivation (X1), and reading comprehension (X2) with literacy ability of student science (Y). The design of this study is as Figure 1.

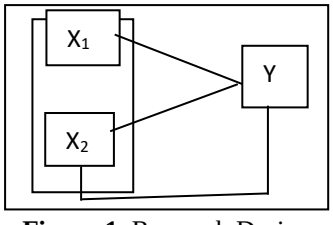


Figure 1. Research Design

RESULT AND DISCUSSION

Analysis of data in this study begins with the test requirements correlation analysis. The analytical requirements used consisted of normality test, homogeneity test, linearity test and regression analysis using Kolmogorov-Smirnov Test. All the above analysis using SPSS.

Data Descriptions

Descriptions of the achievement motivation (X1), reading comprehension (X2) and literacy science (Y) are listed in Table 1.

Table 1. Descriptive Analysis

No	Var.	Mean	Standart Deviation	Max	Min
1.	X_1			183	107
2.	X_2			75	14
4	Y			33	7

Normality Test

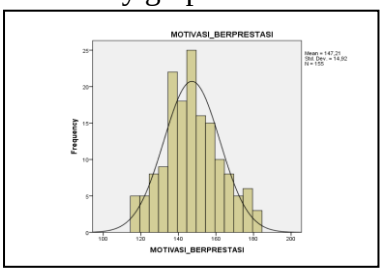
Test normality using Kolmogorov-Smirnov Test. Details of normality test results on each variable can be seen in Table 2.

Table2. Normality Test Result

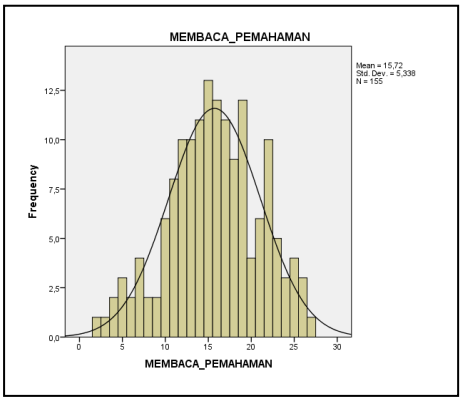
No	Var.	$P_{provision}$	P_{result}
1.	X_1	0,05	0,2
2.	X_2	0,05	0,64
4.	Y	0,05	0,2

X1 = achievement motivation
X2 = reading comprehension ability
Y = science literacy ability

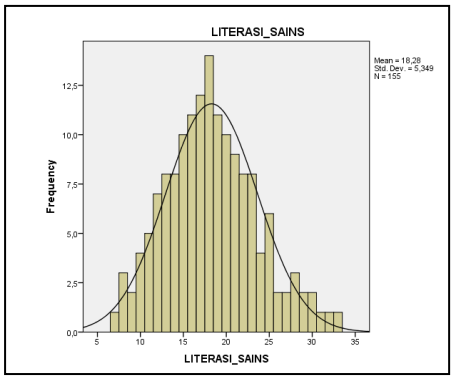
In according to the data in Table 2, for the variable of motivation (X1) has a probability value of 0.2, for the variable, for reading comprehension (X2) 0.64 and the science literacy ability (Y) has a probability value of 0.2. so it can be concluded that the data is normally distributed. In Figure 2 describes the normality graph of X1, X2, and the normality graph on Y.



(a) Achievement Motivation



(b) Reading Comprehension



(c)Science Literacy

Figure 2. (a) Normality X1, (b) Normality X2, (c) Normality Y

Homogeneity Test

Table 3. Homogeneity

Data	Sig.
X_1 with Y	0,419
X_2 with Y	0,162
X_3 with Y	0,110

Based on Table 3. The homogenity test results in all four data indicate that the Sig score. of the four data (0.419; 0.162; and 0.110;> α (0.05) .This shows that the four groups of data are homogeneous.

Linearity test results can be seen in Table 4.

Table 4. Linearity Test Results

No	Var.	Significancy Score	P Provision	Conclusion
1.	X_{1*Y}	0,000	0,05	linier
2.	X_{2*Y}	0,000	0,05	linier

Based on Table 4. can be seen the results of linearity test on between independent variables with the dependent variable, the variable motivation berpretasi

(X1) with the science literacy variable (Y) of 0,000, with the science literacy variable (Y) of 0.000, and the variable reading comprehension (X2) with Y of 0.000. It can be concluded that the variable is linear, so it can be done regression analysis on the data.

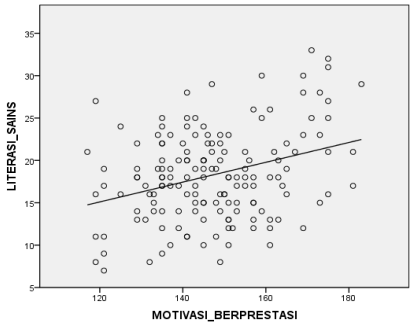
Results Regression analysis of spss as follows:

Table 5. Regression Analysis X with Y

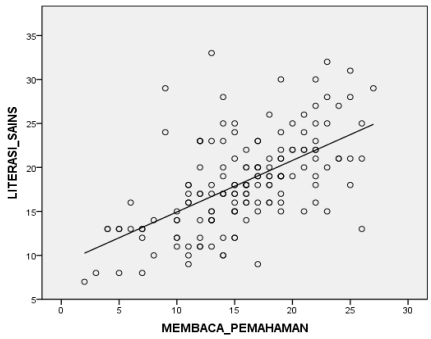
Model	Constant	B	Sig
X_1Y	1.074	0,117	0,000
X_2Y	9,073	0,586	0,000

According to the regression analysis table the following equations are obtained: (1) Regression to predict the ability of science literacy with achievement motivation is as follows: Ÿ = 1.074 + 0.117 X1. (2) Regression to predict the ability of science literacy with critical thinking ability are as follows: Ÿ = 9,073 + 0,586 X2

From the equation the regression analysis results in the graph in Fig. 3. In Fig. 3 shows the linearity between X and Y for Fig. 3 (a) explains linearity X1 with Y, Fig. 3 (b) describes the linearity X2 with Y.



(a)Achievement Motivation



(b)Reading Comprehension

Figure 3. (a) Linearity X_1 with Y (b) Linearity X_2 with Y

Detailed results of multiple linear regression analysis are described in Table 9.

Table 6. Double Regression Analysis Result

Model	B	Sig
X_1	0,053	0,000
X_2	0,537	0,000

From table 6. we get Double Linear Regression Equation Y = 2.076 + 0,053X1 + 0,537X2. Constant of 2.076 means that if there is no ability to read comprehension and motivation berpretasi, then the amount of students' science literacy skills of Senior High School 9 Jakarta is 2.076. Then for the regression coefficient of 0,053 at X1, and 0,537 at X2 indicate that every addition of one level of student's pretreating motivation, the ability of science literacy will increase by 0,053 unit, and increase of 0,537 unit if comprehension comprehension ability increase one unit.

Correlation Test

Correlation Test of Correlation Test Result can be seen in Table 7 below.

Table 7. Correlation Result

No	Correlation	Correlation Coofiensi (r)	R square	P_{count}	Conclusion
1.	R_{x1y}	0,326	0,106	0,00	Positive and Significance
2.	R_{x2y}	0,392	0,154	0,00	Positive and Significance
3.	R_{x2x1y}	0,601	0,361	0,00	Positive and Significance

Table 7. shows that the product moment correlation coefficient for rx1y is 0.326, rx2y is 0.392, and the product moment correlation coefficient for Rx2x1y is 0.601. While the value of p arithmetic between X1 and Y is 0.000 <0,05, p arithmetic between X2 and Y is 0,000 <0,05 and P count between X2X1 and Y is 0,000 <0,05. Thus it can be interpreted that

the correlations X1 with Y, X2 with Y and X2X1 with Y are positive and significant.

For the amount of contribution between X and Y seen from the value of r Square (coefficient of determination). The value of R Square X1Y is 0.106 which means that the motivation of pace has contribution to science literacy ability is 10,6%, while R Square X2Y value equal to 0,154 which means that comprehension comprehension ability has contribution to science literacy ability is equal to 15,4%. The value of R Square X2X1 with Y is 0.361 which means that the motivation of pace, and the ability to read comprehension together have contributed to science literacy ability equal to 36,1%.

Discussion

Achievement motivation has positive correlation with literacy ability of science significantly with ry1 = 0,326. Based on the criteria of Ridwan relationship strength score (2008) including strong because above the number 0.5. The presence of positive relationships contained the meaning that the better the motivation to eat berkretasinya will also increase the ability of science literacy. With the strength of the relationship of 0.326 and the coefficient of determination 0.106 it is said that about 10.6% variance ability literasi science can be explained by the motivation berpretasi students. In other words the motivation of pace contributes about 10.6% there is the ability of science literacy. From this it appears that the variables of motivation berpretasi not the only role in the ability of science literacy. Another factor is the ability to read comprehension.

This is supported by the results of research indicating that the ability of science literacy learners, there are 2 factors that influence are: individual factors and social factors. Achievement motivation is an individual factor that comes from within the learner. The existence of a good motivation in learning will show good results. The intensity of one's motivation learners will greatly determine the achievement of learning, including the ability of science literacy (Bagiarta, et al, 2015).

The relationship between reading comprehension and literacy skills of science has a positive relationship. The presence of positive relationships contained the meaning that the better the ability to read comprehension it will also increase the ability of science literacy. With the strength of the relationship of 0.392 based on the criteria of Ridwan relationship strength score (2008) including strong because above the number 0.5. With determination coefficient 0,154 it is said that about 15,4% variance ability of science literacy can be explained by ability of reading comprehension of student. This means that the ability to read comprehension contributes about 15.4% in the ability of science literacy. From this it appears that the variable reading comprehension ability is not the only one that plays a role in the ability of science literacy. Another factor is the variable motivation berpetasi.

This is supported by research that shows that reading is an essential fundamental skill in the community. It is a communication skill that develops the mind and makes the quality of life better. Reading is an important skill that must be taught, developed and cultivated. Much of the literature of science lies in the skill of reading and understanding of science texts. students must have the ability to read in science learning. Reading text involves special skills that go beyond basic reading skills. When students enter high school, they are introduced to high-level science concepts and able to read and understand. The text of science involves more abstract and technical concepts that may be contrary to intuition or even alien to a student's previous life experience. The text of science can also be more challenging because they often have higher lexical density, or a large number of embedded content words in which words not only have their own meaning but may also require an understanding of the processes involving the word. The ability to read texts of science is very important for students to be

able to learn and excel in science classes and in their daily lives. It is also a component to be able to work and contribute to the global community in which we all belong. There is literacy result of scientific reading for students. When students can effectively read science, they can connect new concepts with prior knowledge and experience, making the relevance between learning and their life. Using visual factors (such as charts and diagrams) in the text helps create relationships within the text, can understand new things. Have a good enough idea to connect to different contexts, and can apply new knowledge to other scientific articles and support or explain them using appropriate scientific vocabulary. Good readers have prior knowledge, form hypotheses, make plans, evaluate understanding, determine interests of information, describe patterns, compare and differentiate, make conclusions, draw conclusions, generalizations, evaluation of resources (Hart, 2012).

Also supported by research results that show that good reading ability is very important to learn the concept of science. The text of science is often more difficult for students than any other type of text. The text of science is difficult to understand because it often eliminates important background information, fails to make connections between concepts, students may have the ability to read and know words, identify and find information, and remember content, but may not be able to analyze, summarize, or criticize the text when asked to do so. This is experienced from the basic to intermediate level, which results in a negative impact on science learning. Lack of understanding in reading science texts frustrates students. Reading skills such as identifying ideas, making the main thoughts, conclusions and classifications are also used in science. Good readers are readers who gain prior knowledge, construct hypotheses, define plans, have an understanding, identify relatively important information, describe patterns, compare and differentiate, make inferences, generalize and evaluate the source (Imam et al, 2014).

There is a positive relationship between the two independent variables with the ability of science literacy to mean that the two independent variables as predictors of the variance of literacy ability of science is significant. With coefficient correlation coefficient of ry12 0,601. based on criteria of Ridwan relationship strength score (2008) including strong because above the number of 0.5. With the determination of 0.361, then the contribution of yag is given by the motivation of pace, and the ability to read comprehension together is the remaining 36.1% about 63.9% is determined by other factors outside the three variables in question.

Also supported by the results of research that shows that reading understanding with motivation are both highly related in academic, reading is the basic and vital part of the learning process. Motivation has an important impact on academic success. Students do not understand the material if they have not read the material. Motivation helps students to gain a better understanding. Motivation to guide students directly on reading comprehension techniques. Students who are motivated to read will want to read and most likely succeed in reading comprehension. Motivated students will understand better than not be motivated. Smart students may not have a reading comprehension, because they are not motivated. The reading comprehension becomes much more by involving part of the complex activities of motivation such as willing to do the difficult and the internal defensive impulse in the difficulty (Knoll, 2000).

CONCLUSION AND RECOMMENDATION

Conclusion

The higher the achievement motivation of the students will be the higher the ability of science literacy. It also means that the improvement of achievement motivation is

followed by the increase of science literacy ability, or the decrease of achievement motivation is always followed by the decreasing ability of science literacy. From the results of the contribution obtained by 10.6% can be shown also that achievement motivation also determine the ability of science literacy students.

The higher the students' reading ability the higher the literacy ability of science. This also means that improving the ability to read comprehension is followed by an increase in the ability of science literacy, or decreased ability to read comprehension is always followed by an increase in the decreased ability of science literacy. From the results of the contribution obtained by 15.4% can be shown also that the ability to read understanding also determine the ability of students' science literacy.

Together, the higher the motivation of pretreatment, and the ability to read students' understanding of the higher the ability of science literacy. It also means that improving the motivation of pretreatment, and the ability to read comprehension simultaneously is always followed by increased literacy skills of science, or decreased motivation of pace, and the ability to read comprehension together is always followed by an increase in the decrease in literacy skills of science. From the results of the contribution obtained by 36.1% can be shown also that the motivation of pace, and the ability to read comprehension together to determine the ability of science literacy students. the remaining 63.9% is determined by other factors outside the three variables. Thus it is recognized that there are other factors that affect the ability of science literacy.

Recommendation

The ability of science literacy in high school is influenced by many factors, either internal factors or in the achievement motivation and reading comprehension ability of students, as well as external factors such as parents, provesional teachers, school facilities and study habits. Increased literacy ability of science depends on the increase of these factors. Literacy of science is one of the abilities to be improved. This increase becomes so important that the state of scientific literacy ability can be achieved. Through this development it is possible to obtain the expected scientific literacy capability. Improvement The ability of science literacy can be done by students through improving motivation of pace, and the ability to read comprehension. Improvement The ability of science literacy can also be done by teachers. The use of model, method, test and literacy improvement of teacher science is a prerequisite.

In connection with the improvement of literacy skills of science for students, it is desirable to develop the ability to read comprehension, and motivation memprestasinya. Secondly, for teachers, it is expected that their assistance in improving students' science literacy skills. Third, for the community especially the parents, support in improving students literal literacy skills is expected. Fourth, for the compilers of science books, it is expected to pay attention to the quality of the contents of the book prepared and analyzed continuously for improving students' literacy skills. Finally, it is desirable for all parties involved in the effort to improve and improve the science literacy skills of high school students.

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