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IMPROVING LEARNING OUTCOMES OF FIFTH GRADE STUDENTS ON THE SCIENCE LESSON OF LIGHT MATERIAL AND ITS PROPERTIES THROUGH APPLICATION OF DEMONSTRATION LEARNING MODELS

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ABSTRACT

This study aims in general to improve the quality of natural science learning in elementary schools, so that knowledge of the material in the science subject of learning is not only in the form of concepts or only theoretically, but can be understood by students correctly, and can be applied to everyday life. This form of research is a classroom action research with the implementation model that is carried out in two cycles. Each cycle consists of 4 stages of planning, conducting, observing, analyzing and reflecting. The subjects of this study were at SD Rancakasumba year lesson 2017/2018. Technique of data analysis using interactive model consisting of 3 component of analysis that is data reduction, data presentation and verification.The results of the study can be seen from all sides who achieve mastery learning, namely students achieve a value of ≥ 70 increases, from 26.1% at the beginning to 65.2% in cycle I. After the action in cycle II, it increases again to 87%, or increased by 22% of completeness in cycle I. It was reflected in the entire cycle that can be done which allows students to improve student learning abilities in grade IV students of SDS 347 Rancakasumba 2017/2018 Academic Year.

Keywords: Demonstration learning models, science lesson, light material.

INTRODUCTION

Natural Sciences (IPA) is related to how to systematically find out about nature, so that IPA is not only mastering a collection of knowledge in the form of facts, concepts, or principles, but also a process of discovery. Science education is expected to be a means for students to learn about themselves and the natural surroundings, as well as the prospect of further development in applying it in their daily lives. Therefore the science learning process must emphasize giving direct experience to develop student competencies. Learning science should be carried out in scientific inquiry (scientific inquiry), to foster the ability to think, work and be scientific and communicate it as an important aspect of life skills.

Core Competencies (KI) and Basic Competencies (KD) of Science in Elementary School are minimum standards that nationally must be achieved by students, and become a reference in curriculum development in each education unit. The achievement of KI and KD is based on empowering students to build abilities, scientific work, and their own knowledge facilitated by the teacher.Based on the experience and findings of the learning process in Class

Journal of Elementary Education
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IV of 347 Rancakasumba Elementary School, Arcamanik District, Bandung City, science learning still emphasizes the concepts contained in the book, and has not utilized the use of visual aids optimally. Students are less brought to interact directly with the environment. Natural Science learning tends to maintain the order in the book, without regard to conformity with the student learning environment, so as to make learning ineffective, because students do not pay attention to the lessons delivered. Various shortcomings in science learning that were identified include that during learning students do not take lessons correctly, are less involved in the learning process, do not dare to answer teacher questions, cannot absorb learning material in accordance with expectations, and cannot answer questions well and correctly.

Based on the description on the background of the above problems, the formulation of the problem in this study is: Does the demonstration learning model improve student activity and learning outcomes in science subjects in light material and their properties, in Grade IV students of 347 Rancakasumba Elementary School, Arcamanik District, Bandung City . In line with the formulation of a predetermined problem, then the researcher further sets the research objectives for both general and specific objectives. In general, this classroom action research aims to improve the quality of natural science learning in elementary schools, so that knowledge of the material in the eyes of science learning is not only in the form of concepts or only theoretically, but can be understood correctly by students, and can be applied to everyday life. The specific purpose is to know; whether the application of demonstration learning models can improve the ability of Grade IV students of 347 Rancakasumba Elementary School in Arcamanik Subdistrict, Bandung City, in understanding light material and its properties in natural science learning.

The results of the study are expected to provide theoretical benefits, namely as information for teachers in elementary schools about the importance of applying demonstration learning models, in improving the quality of the science learning process, especially in the delivery of light material and its properties, which can be taken into consideration in making planning for the next science learning process, so that it can expand knowledge in recognizing more creative learning models, as well as how to apply it or use it in accordance with natural science learning planning, and can provide alternatives in the implementation of learning models, especially demonstration learning models, to improve the quality of learning achievement various science subject matter.

Thinking Framework

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
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The results of preliminary observations of the process and learning outcomes of science in light material and its properties carried out by researchers and studies of various theories about science learning, especially on light material and its properties, which is the background of this research problem, the researchers set the framework for thinking as follows:

1. There are several difficulties in directing student activities to understand the learning materials in science learning.
2. The lack of skills of teachers in carrying out science learning, has an impact on the implementation of the learning process that does not take place correctly, and is not in accordance with the characteristics of science subjects.
3. Science learning in elementary schools must be improved, so that it no longer takes place conventionally, namely teacher-centered and more use of lecture methods, so that the science learning achievements achieved by students are still very low.

Therefore, the use of demonstration learning models must be used as an effort to achieve better student achievement. For this reason, the researcher made the following research framework:

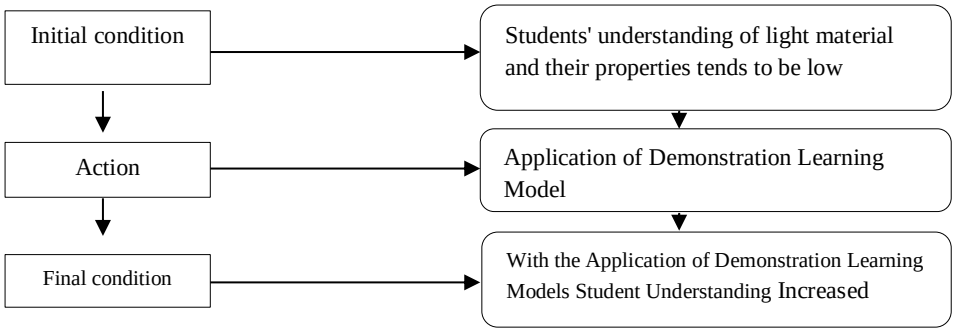

Figure 1. Thinking Framework

Learning About Natural Science

Learning is one of the factors that influence and play an important role in the formation of individuals and individual behavior. Learning can also be interpreted as a process characterized by a positive change in a person both in terms of skills, habits, knowledge, understanding, behavior, skills and abilities resulting from experience and training (Nana Syaodih Sukmadinata, 2004: 155). Whereas according to Garry and Kingsley (Sunaryo K, et al. 1999: 57) states that learning is a process of behavior (in the broad sense) generated or changed through practice and practice. Another definition is mentioned by Oemar Hamalik (2005: 27) that, learning is a modification or reinforcing behavior through experience, "learning

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

is defined as modification or strength of behavior through experiencing" According to this understanding learning is a process, an activity and not an outcome aim. Learning is not just remembering, but wider than that, namely experiencing.

According to Jerome Brunner (Trianto 2009: 15) that learning is an active process in which students build (construct) new knowledge based on the experience / knowledge they already have. Meanwhile, according to Siddiq, et al (2008: 1.3) learning is an intentional activity carried out by individuals so that there is a change in self-ability, by learning that children who were not able to do something, being able to do something, or children who were not skilled at being skilled.

Skinner in Rifa'i and Anni (2011: 106) states that learning is a process of behavior change. Behavior in learning has a broad meaning; the properties of light can be in the form of behavior that is not visible (inner behavior) or behavior that looks (over behavior). Learning as a process, in activities takes time to achieve learning outcomes, and learning outcomes are in the form of more perfect behavior compared to behavior before learning activities.

Based on the explanations regarding the understanding of learning from several experts described above, it can be concluded that learning is a process of changing the behavior of an individual, which is obtained from the learning process in the form of experience and behavioral changes. These changes are relatively permanent, and can build new knowledge of acquired knowledge and new knowledge. The process of behavioral change that is produced takes quite a long time according to the ability of each student or individual in learning.

According to Law Number 20 of 2003 concerning National Education System, learning is the process of interaction between students and educators and learning resources in a learning environment. Meanwhile, according to Gagne, Briggs and Wagner in Udin S. Winataputra (2008) learning is a series of activities designed to enable the learning process to occur in students. In teaching there are various models. The basic teaching model includes:

1) Learning Objectives

This learning objective can determine all activities and learning contents. Learning objectives are basically a formulation of the forms of behavior students will have after learning, or after following the learning process.

2) Introduction to Student Conditions (Entry Behavior)

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

The introduction of the state of the student is done before the learning process takes place (entry behavior), namely whether students master the learning material to be given, or how the students are likely to master the learning material to be taught.

3) Procedure or Learning Strategy

Procedures or learning strategies include

a) What learning methods are used and what activities will be carried out.

b) What tools or media will be used.

c) How long the learning process takes place.

4) Assessment of Learning Outcomes

The final step of the learning process is to carry out an evaluation or assessment of the extent to which the learning process can achieve its goals. This is also important as feedback in seeing goals, student recognition and learning procedures.

In essence, learning is an effort made by someone (teacher or another) to teach students who learn according to Mudhofir (1987: 30) in the outline there are four learning patterns. The first learning pattern is in the form of teaching aids. This learning pattern is very dependent on the teacher's ability to remember learning materials and convey the material orally to students. Both patterns (teacher + tools) + (media) with students. This learning pattern has considered the limitations of teachers, which may not be the only source of learning. Teachers can utilize various learning media as learning resources that can replace teachers in learning. The consequence of this learning pattern is that learning materials must be prepared that can be used in learning. The four patterns of media or learning materials prepared. Based on the learning patterns mentioned above, teaching is not just teaching (like pattern one), because successful learning must give a lot of treatment to students.

The role of the teacher in learning is more than just learning (informatory), but the teacher must be multi-role in learning. Oemar Hamalik (2005: 123 - 126) the teacher's role is actually very broad. In relation to learning activities as a mental and emotional process of students in achieving progress, the teacher should play a role in facilitating so that students' mental emotional processes can be achieved so that progress can be achieved. Teachers must act as a driving force for learning activities by means of learning by motivating students, facilitating, organizing classes to expand learning materials, and assessing the process of learning outcomes, and monitoring student activities.

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

The understanding of learning models as stated by Joyce and Weil (Abimanyu, et al. 2008: 4), that the learning model is a conceptual framework that describes systematic procedures in organizing learning experiences to achieve certain goals that serve as guidelines for learning designers and instructors in planning and implementing learning activities. Thus the learning model is a plan or a pattern that is used as a guide in planning learning in class to determine learning tools including books, films, computers, curriculum, and others.

Also put forward by Soekamto, et al (Trianto 2009: 22) that the learning model is a "conceptual framework that describes systematic procedures in organizing learning experiences to achieve certain learning goals, and serves as a guide for learning designers and instructors in planning teaching and learning activities. "

Another opinion expressed by Suprijono (2011: 45-46), which states that the learning model is the basis for the practice of learning resulting from a decrease in educational psychology theory and learning theory designed based on an analysis of curriculum implementation and its implications at the operational level in the classroom. Meanwhile, according to Ismail (Widyantini, et al. 2008: 4), the term learning model has a broader meaning than strategies, methods, or procedures. A learning model has four special characteristics that are not possessed by a particular strategy or method, namely logical theoretical rationales that are compiled by the creator, learning objectives to be achieved, teaching behavior needed so that the model can be implemented, and the learning environment needed for the purpose learning can be achieved.

Based on the above notions, it can be concluded that the learning model is a pattern that is designed systematically by the teacher, in organizing the acceptance of students' learning experiences, and becomes a teacher's guide in carrying out learning. Through the application of the learning model is expected to materialize student activity in learning, so that learning outcomes will be more improved than learning that does not apply the learning model.

Regarding the demonstration learning model, put forward by Sanjaya (2006), and Sumantri and Permana (1998/1999) that demonstration is a way of presenting lessons by demonstrating and demonstrating to students about a particular process, situation or object being studied, both in its actual form and in the form of imitation shown by the teacher or other learning resources (experts in the topic of discussion that must be demonstrated). This method is usually related to the actions or procedures performed, for example: the process of doing something, comparing a method in another way, to find out/see the truth of something.

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

The advantages of the demonstration model:

1) Lessons become clearer and more concrete so there is no verbalism.
2) Students will find it easier to understand the subject matter being demonstrated.
3) The learning process becomes better, because students not only hear, but also see events that occur.
4) Students will actively observe and be interested in trying.

Weakness of the demonstration model:

1) Not all teachers can do demonstrations well.
2) Limited learning resources, learning tools, learning media, situations that are often not easily managed and limited time.
3) Demonstrations require more time than lectures and FAQs.
4) The demonstration method requires careful preparation and planning.

Steps of the demonstration learning model:

1) The teacher submits the TPK.
2) The teacher presents a glimpse of the material to be delivered.
3) Prepare the necessary materials or tools.
4) Shows one student to demonstrate according to the scenario prepared.
5) All students pay attention to demonstrations and analyze.
6) Each student or group presents the results of their analysis and also the student experience is demonstrated.
7) The teacher draws conclusions.

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

Definition of Light

Light is the name that humans give to radiation that can be seen by the human eye. Light is an electromagnetic wave, which is a wave whose vibration is an electric field and a magnetic field. Based on the type, light is divided into visible light and invisible light. Visible light is light which, when it comes to objects, can be seen by humans, examples of sunlight. The invisible light is light that when it comes to objects will not appear brighter or still the same before being exposed to light. Examples of invisible light are infrared and x rays. Visible light is divided into 2, namely monochromatic and polychromatic. Monochromatic is a light consisting of one color, for example red. While polychromatic is a light consisting of several colors, for example purple, is a combination of red and blue.

We need light to be able to see. The objects that are around us can be seen when there is light about the object, and the light that hits the object is reflected by objects into the eye. Even if the object is exposed to light, if the reflection is blocked from our eyes, we cannot see the object, for example an object that is behind a curtain or wall.

An object can be seen because of the presence of light, which radiates or is reflected from the object, which reaches the eye. Based on the source of light is divided into two types, namely:

1) Light that comes from the object itself, such as the sun, flashlight, candle and lamp.
2) Light that emits from objects due to bouncing light on the surface of the object from a light source. Light that emanates from a color and is blue, meaning that the object reflects blue light.

Based on whether or not light emits, objects are grouped into objects of light and dark matter. Light source objects can emit light. Examples of light source objects are sun, lights, and flames. Dark objects cannot emit light. Examples of dark objects are stones, wood and paper.

The Properties Of Light

Light has certain properties. The properties of light have many benefits for life.

1) Straight Creepers

When walking in the dark, we need a flashlight. The light from the flashlight is in the direction of the propagation in a straight line. Or when we see the sunlight penetrating through the roof. Both of these things prove that the light propagates straight. Activities that can prove that the light is stretching straight is by using a cardboard that is given a hole like the picture

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

on the side. When the cardboard hole is arranged straight we can see the candle light, but when one of the holes is shifted we can no longer see the light. The nature of the light that always propagates straight is used by humans in the manufacture of flashlights and lights of motorized vehicles.

2) Light can penetrate clear objects

Observe when you walk in the sun. Wherever you walk, your shadow is always followed. The shadow of your body will disappear when you enter the house or take shelter behind a large tree. Shadows are formed because light cannot penetrate an object. When light hits your body, light cannot penetrate your body so it forms a shadow. Likewise, when light hits your house and a large tree. Shadows are dark areas formed by light that cannot penetrate an object. Shadows are divided into two, namely real images and virtual shadows. A virtual image (pseudo) is a shadow that can be seen by the eye, but cannot be captured on the screen, while a real shadow is a shadow that can be captured by the screen.

Based on whether or not it is translucent, objects are classified into three types:

a) Opaque or translucent objects, are dark objects that cannot be penetrated by light at all. Opaque reflects all the light about it. This kind of object for example is books, wood, walls, and turbid water.
b) Clear objects, namely objects that can be penetrated by light. Clear objects are also often called transparent objects. Transparent objects carry all the light around them. For example clear glass and clear water
c) Translucent objects, translucent objects are objects that can pass on some of the light that comes and spreads some of the other light. For example, thin curtain fabrics, and some types of plastic.

3) Light can be reflected

Reflection (reflection) or mirroring is the process of re-transmitting light from the surface of objects exposed to light. An example of a light reflection event is when we reflect. The shadow of our body will be seen in the mirror, because the light reflected by our body, when it hits the mirror surface, is reflected, or re-emitted until it enters our eyes. Reflection on the mirror, including regular reflection. Regular reflection occurs on objects whose surface is flat and shiny / slippery. In this kind of object, light is reflected in parallel directions, so that it can form very good shadows. In objects with uneven surfaces, the incoming light is reflected in irregular directions. Such reflection is called diffuse reflection, or diffuse reflection.

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

METHOD

The method used in this study is a qualitative method with classroom action research techniques (action research). According to Suharjono (Arikunto, 2006: 58) "classroom action research is action research conducted in the classroom with the aim of improving / improving the quality of learning practices." In line with this opinion, the definition of action research proposed by Wiriaatmadja (2008: 13) is as follows:

Classroom action research is how a group of teachers can organize the conditions of their learning practices, and learn from their own experiences. They can try an idea of improvement in their learning practices, and see the real influence of that effort.

The purpose of classroom action research according to Suharjono (Arikunto, 2006: 61) is as follows. (1) improve the quality of content, input, process, and the results of education and learning in schools; (2) helping teachers and other education personnel overcome learning problems at school; (3) improve the professional attitude of educators and education personnel; and (4) fostering academic culture in the school environment so as to create a proactive attitude in improving the quality of education and learning in a sustainable manner.

Through classroom action research (PTK), researchers can conduct learning activities in their own classrooms, because with PTK researchers will be able to improve the quality of the process and the results of their learning. Through classroom action research, the teacher can examine his own learning process in class. Thus in class action research, researchers can examine student activities in learning, among others, the interaction between students and students, between students and teachers, and between students and the learning material delivered. In addition, with classroom action research, teachers can correct and correct actions in learning, so that learning is more interactive, as well as applying theories for the sake of improving the quality of learning processes and results, so as to realize more effective, optimal, and functional learning.

This research was conducted at Rancakasumba 347 SDS, Arcamanik Sub-District, Bandung City, so that the research would run smoothly. The location of this study was chosen because of direct access as a place for researchers to carry out daily tasks so as to facilitate the implementation of research because it was directly implemented in the learning process. As planned, this classroom action research is carried out with the following activities:

1) Planning

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

At this stage the researcher prepares carefully so that the learning objectives of science can be achieved, including the following activities:

a) Preparing appropriate learning media to improve learning outcomes in science learning in light material and the properties of light.
b) Make a plan using a demonstration learning model.
c) Simulate science learning by developing demonstration learning models.
d) Make an observation sheet.
e) Design evaluation tools.

2) Implementation of actions

The implementation of this action is the implementation of the learning plan that has been prepared. At this stage the learning process, apperception, pre-test, learning and evaluation stages are carried out. At the apperception stage, students are conditioned to be ready to follow the learning process; the teacher gives an explanation to students about the learning objectives and the benefits that students will get after attending the teaching and learning process.

Furthermore, in the stages of learning carried out, researchers applied a demonstration learning model, which was varied with the question and answer method, lectures and discussions, so that students more easily understood the material presented.

3) Observation

At the observation stage, researchers together with colleagues who help this activity, observe the activities and behavior of students when the learning process takes place. The target that is observed is the activeness of students in doing the tasks and seriousness of students in following the learning.

4) Reflection

In the reflection stage, data collection is obtained through observation, then analyzed to find out whether the actions taken have reached the expected goals or not. Based on the results of these observations, researchers can reflect on the learning activities that have been carried out, so that they can be used as a basis for classroom action in the next cycle.

Data collection is a core activity in CAR because this process determines the quality of the CAR process. Data collected from actions in the form of qualitative data. After the data is collected, it is then analyzed and reflected, to analyze things that occur during the learning

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

activities, in the form of descriptions of the findings of the research results. The data collection activities are carried out through the following activities:

1) Test; The form of the test used is an objective form test, which is a written test that requires students to complete the question with words, phrases, or short sentences as answers.
2) Documentation; Documentation activities are intended to collect data using documents in the form of notes, value lists, activity photos, student work documents, attendance, etc. These documents are used to find out and explore information about students' understanding of the acquisition of grades as a result of learning. Besides that it is also useful as evidence of the implementation of actions.
3) Observation; Observation is a data collection technique that is carried out systematically and intentionally, which is carried out through observing and recording the symptoms investigated.

In this study observations were made on students 'and teachers' behavior when learning took place. The data collection tool used in conducting this observation consisted of student observation sheets and teacher observation sheets.

RESULTS AND DISCUSSION

Results

Before the implementation of cycle I, researchers first observed the learning process of science in class IV to get an initial picture. In this study the research subject was Class IV SDS 347 Rancakasumba, which consisted of 23 students, consisting of 8 male students and 15 female students.

Based on the results of observations that have been made in the initial research activities through observations of the science learning process and the results of the pre-test scores, on the light material and its properties, most students get grades under the Minimum Completion Criteria (KKM) which is 70.

The results of data analysis obtained in the initial conditions, the average value of 53.74 (indicating the criteria of "low"), as presented in the table of the pre-test results below.

Table 1. Analysis and Recapitulation of Completeness of Pre Test

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

Grade	Frequency	Completion	Percentage
< 70	17	Not complete	73,9%
≥ 70	6	Complete	26,1%
Amount	23		100%
Average	53,75		

From the table above, it can be seen that the completeness of learning in light and its properties achieved by students only amounted to 26.1% (6 students) of the total 23 students and 73.9% (17 students) had not been completed compared to the KKM specified (70), with a low average value of 53.75. The complete list of pre-test results is presented in the appendix. Based on the results of the Pre Test above it can be concluded that students do not understand light material and its properties, can be seen from the average student's low score of 53.75. This condition makes researchers feel the need to conduct learning actions to help improve students' understanding of learning about light material and its properties.

Based on the results of the analysis of the action cycle I of science learning with demonstration learning models to increase student activity and learning outcomes on light material and its properties in class IV SDS 347 Rancakasumba, it was not satisfactory. Judging from the evaluation values of students who have increased, but have not yet reached the criteria that an increase in understanding is achieved, because students who complete learning only reach 65.2%, while the completeness criteria is if more than 75% of students achieve completeness.

Table 2. Analysis and Completeness Recapitulation of Cycle I

Grade	Frequency	Completion	Percentage
< 70	7	Not complete	34,8 %
≥ 70	15	Complete	65,2 %
Amount	23		100%
Average	62,52		

Students who have an evaluation value of ≥ 70 (KKM) are 15 students (65.2%), while those who have not met the KKM are 7 students (34.8%), with an average score of 62.5

Based on the results of the analysis on the action of the second cycle of natural science learning with demonstration learning models to increase student activity and learning outcomes in light material and their properties in class IV SDS 347 Rancakasumba, was quite satisfying. Judging from the evaluation values of students who have improved better, the acquisition of evaluation scores has reached the criteria of completeness, an increase in understanding is

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

achieved. This can be seen from the number of students who completed learning that reached 87%.

Table 3. Analysis and Completeness Recapitulation of Cycle II

Grade	Frequency	Completion	Percentage
< 70	3	Not complete	13%
≥ 70	20	Complete	87%
Amount	23		100%
Average	62,52		

Students who have an evaluation value of (70 (KKM) are 20 people (87%), while those who have not fulfilled the KKM are 3 students (13%), with an average score of 74.57.

Discussion

Learning outcomes achieved by students during learning, related to the understanding of light material and its properties, can be seen from the observations or observations made by observers and researchers. Student learning outcomes during learning are presented in the table below:

Table 4. Comparison of Pre-Cycle, Cycle I, Cycle II Student Learning Completeness

Observation Aspect	Pre-Cycle		Cycle I		Cycle II	
	Students	Percentage	Students	Percentage	Students	Percentage
Learning Completeness	23	26,1%	23	65,2 %	23	87%

From the comparison of students' mastery learning in Pre-Cycle activities, Cycle I, Cycle II in Table 4.4 above, can be described that the achievement of student learning outcomes increased. Thus the students' understanding of the light material and its properties are conveyed during the learning, using the demonstration learning model increases.

CONCLUSION

Based on the results of action research on the application of demonstration learning models, to improve science learning outcomes the light material and its properties, in the fourth grade students of SDS 347 Rancakasumba Academic Year 2017/2018, can be drawn as follows:

1) The demonstration learning model can improve the learning abilities of Grade IV SDS 347 Rancakasumba students in science subjects in light material and their properties.

Journal of Elementary Education
Volume 01 Number 04, July 2018
E-ISSN: 2614-4093
P-ISSN: 2614-4085

This is indicated by an increase in the percentage of students who achieve mastery learning, namely students achieve a value of ≥ 70 increase, from 26.1% in the initial state to 65.2% in cycle I. After the action in cycle II, the percentage of students who achieved completeness learning, increased again to 87%, which was seen in the number of students who reached KKM or more, as much as 20, or increased by 22% of completeness in cycle I. From the increase in learning outcomes achieved by these students, it can be said that the application of demonstration learning models, able to improve student learning abilities about light and its properties.

2) The demonstration learning model can also improve the activeness of students in the learning process. This increase can be seen from the results of observations made during the learning process, which illustrates the active activities of Class IV SDS 347 Rancakasumba students in studying light material and their properties. The demonstration learning model is more appropriate to be applied to science learning, especially to learning to convey light material and its properties, because with the demonstration learning model, students in Grade IV SDS 347 Rancakasumba can find an event directly from the results of the demonstration, so students do not get the concept of light and its characteristics, only from the teacher's explanation that comes from the textbook. Thus students' understanding of learning material, can last longer, can even be applied to everyday life.

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