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Improving Student Learning Outcomes Through the Application of the Problem Based Learning Model in Natural Sciences Subjects

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ABSTRACT

The research intends to find out or describe the increase in student learning outcomes by using the Problem Based Learning (PBL) learning model in science learning with material on the properties of light in class IV MI students. Safinatul Huda Jepara. This research is a classroom action research consisting of three cycles, each cycle consisting of four stages, namely planning, implementing, observing, and reflecting. Data collection techniques used are tests, observation and documentation. While the data collection instruments used test questions, observation sheets and documents. The data analysis technique was carried out in a descriptive analytic manner. The results of the research show that the learning model of the Problem Based Learning (PBL) learning model can improve the learning outcomes of class IV MI students. Safinatul Huda. The increase in students who complete learning from Cycle I to Cycle II was 9.1% and Cycle II to Cycle III was 27.3%. This can be seen in the acquisition of completeness of student learning outcomes in Cycle I has an average of 70.9, Cycle II has an average of 74.5, and Cycle III has an average of 85.4. Students have achieved a classical KKM of 90.9%. Students who have not finished studying in cycle III will be given independent action in the form of exercises or remedies monitored by the teacher so that it is hoped that all students can complete it.

Keywords:
Learning Achievement Science, Problem Based Learning

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A. Introduction

So far, there are still many learning processes that are carried out with conventional learning models. In practice, science learning with light properties material is still abstract, in fact, teachers can present the material in a more concrete way. One of them is the material of light properties. The learning activities carried out by teachers are using conventional methods with the stages of explaining, the stages of giving examples and the

stages of giving practice assignments, in addition to the fact that teachers do not use learning media, this is a lot of students who are less enthusiastic, unwilling to try, less happy and indifferent to the lessons, this can be seen from indicators such as lack of concentration, lack of enthusiasm in learning, not diligent in doing the tasks given by the teacher (Slameto, 2010). Sometimes, the question and answer method is also carried out to form an interaction between teachers and students. Nevertheless, the learning process still seems to be teacher-centered learning. This can be seen from the reluctance of students to actively ask or answer questions from teachers bravely. The lack of teachers to collaborate on various media and learning methods and still tends to be a conventional learning model, namely: dominant lectures and minimal learning media that are close to students.

In fact, there are still a lot of science learning that is considered difficult for Madrasah Ibtidiyah students. This is evident from the results of the data of the fourth grade teacher of MI. Safinatul Huda, there are science learning results of students with light properties that are still low and have not reached the minimum completeness criteria that have been determined by the school, which is at least 70. Of the 22 students, there are 55% who do not meet the KKM and only 45% who meet the KKM. Thus, in the learning of science material on the properties of light in grade IV there are several problems, namely there are 13 students who do not understand the science materials and the lack of use of the learning model used during learning, because the teacher only uses conventional methods with the stages of explaining, the stage of giving examples and the stage of giving practice assignments, in addition the teacher does not use learning media, this is many students who are less enthusiastic, do not want to try, in the material properties of light.

One of the learning models that is believed to improve learning outcomes is the problem-based learning model. Problem based learning is a learning model that challenges students to learn, work in groups to find solutions to real-world problems. This problem is used to bind students to curiosity in the learning that is carried out. Problems are given to students, before students learn concepts or materials related to the problem that must be solved (Wisudawati, 2014). Thus, to solve these problems, students will know that they need new knowledge that must be learned to solve the given problem (Poerwanti Endang et al., 2004). The role of teachers in this learning is not as a source of information, but must guide children more to get information.

By using this learning model, it is hoped that students can work together with their colleagues to solve a problem or a case. Then students will present the results of solving problems in front of the class. The application of this method is intended so that students actively participate in learning by stating what has been understood in the learning process. The most appropriate action to solve the problem. Based on the theoretical studies, empirical studies and the framework of thinking that have been described, the action hypothesis in this study is to Improve Student Learning Outcomes Through the Application of the Problem Based Learning Model for Science Subjects of Light Properties in Grade IV MI. Safinatul Huda Jepara for the 2022/2023 Academic Year.

B. Theoretical Framework

The Essence of Learning

Learning is the process of seeking knowledge to change oneself well, according to the level of knowledge achieved. Knowledge here means whole, both religious and general knowledge. Learning can be interpreted as the process of changing behavior due to the interaction of individuals with their environment (Oemar Hamalik, 1986). Learning outcomes are behavioral changes obtained by students after experiencing learning difficulties (Rifa'i Achmad and Catharina Tri Anni, 2011). Learning outcomes are the abilities that students have as a result of learning and can be observed through student performance (Poerwanti Endang et al., 2004). Learning outcomes are the level of success of students after participating in the learning process (Gagne et al., 2014).

Learning outcomes are changes that occur in students, both related to cognitive, affective, and psychomotor aspects as a result of learning activities. The definition of learning outcomes as described above, was reiterated by Nawawi who stated that learning outcomes can be interpreted as the level of success of students in learning subjects at school which is expressed in the scores obtained from test results on a number of certain subject matter. Meanwhile, Sudjanah argues that student learning outcomes are essentially behavioral changes and as feedback in an effort to improve the teaching and learning process (Sudjana and Ibrahim, 2007).

Factors Affecting Learning Outcomes

Several factors that affect a person's learning outcomes according to education experts, such as Slameto's opinion, learning outcome activities are influenced by two factors, namely internal factors and external factors (Slameto, 2010). Internal factors are factors that originate in students that affect their learning ability. These internal factors include intelligence, interest and attention, learning motivation, perseverance, attitudes, learning habits, as well as physical conditions and health, while external factors are factors that come from outside the student that affect learning outcomes, namely family, school and society. Family circumstances affect student learning outcomes. An unharmonious family, an unsupportive economy, quarrels between husband and wife can be a trigger for low student learning outcomes.

Assessment of Learning Outcomes

Assessment is a series of activities to obtain, analyze and interpret data about the learning process and outcomes of students which are carried out systematically and continuously, so that it becomes meaningful information in decision-making (Trianto, 2009). The assessment must include three aspects of ability, namely cognitive, affective and psychomotor which can be in the form of written tests, performance, assignments or projects, and portfolios. Cognitive assessment solely assesses a student's knowledge of facts, concepts and theories. Skills assessment measures students' motor abilities in scientific work following the steps or sequences that must be carried out in carrying out activities (*Permendiknas RI No. 22 of 2006).* The assessment aims to measure how far the success of the teaching and learning process that has been implemented, developed and instilled in schools and can be lived, practiced/applied and maintained by students in daily life (Trianto, 2011).

The Nature of Natural Sciences (IPA)

Natural Sciences are often referred to as science education, abbreviated to science. Natural Sciences is one of the main subjects in the educational curriculum in Indonesia, including at the elementary school level. Science subjects are subjects that have been considered difficult by some students, starting from elementary school to high school (Susanto, Ahmad, 2019). Natural Science is a vast human knowledge obtained by means of systematic observation and experimentation, and explained with the help of rules, laws, principles, theories and hypotheses (Srini M. Iskandar, 2009).

The reason why science subjects are included in a school curriculum is that science is beneficial to a nation, the welfare of a nation depends a lot on the nation's ability in the field of science, if taught in the right way, then science is a subject that trains / develops critical thinking skills. Science is taught through experiments carried out by children themselves, not a mere memorization subject, science subjects have educational values, namely being able to shape the child's personality as a whole. Science learning includes learning science processes and products. The object of the science learning process is scientific work (procedure), while the object of science products is factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge (Samatowa Usman, 2011).

The Nature of the Problem Based Learning (PBL) Model

The Problem Based Learning model is a learning model, in which students are faced with a problem from the beginning, then followed by a student-centered information search process (Suprihatiningrum Jamil, 2016). Problem Based Learning is used to support higher-order thinking patterns (HOTs or Higher Order Thinking) in problem-oriented situations. The role of teachers in PBL is to ask problems, provide questions and facilitate investigations and dialogues, teachers must provide students with additional abilities and find intelligence (Wisudawati, 2014).

This learning model is a series of learning activities that emphasize the process of solving problems faced scientifically. The problem-based learning model includes activities in the form of students actively thinking, communicating, searching and processing data and finally concluding (Khanifatul, 2019).

Learning Steps in *Problem Based Learning*

Learning Steps in Problem Based Learning, namely:[19] Phase 1: Providing orientation to a problem to students. In this step, the teacher clearly communicates the learning objectives, builds a positive attitude towards the learning, and describes something that students are expected to do (Wisudawati, Asih Widi and Eka Sulistyowati, 2019). Phase 2: Organizing students to research. Teachers develop collaboration skills between students and help to investigate problems together. In this step, teachers help students plan investigative and reporting tasks that can be done by forming cooperative study and planning teams. Phase 3: Assisting in individual or group investigations. Teachers assist students in carrying out investigations both individually and in groups by collecting data and conducting experiments as well as developing hypotheses, explaining and providing solutions. Phase 4: Develop and present the results. The end result of the Problem Based Learning model is a work that can be reported. The report contains the problem, the purpose of the problem, alternative problem solving which can be in the form of a written

report, computer program, or multimedia presentation. Phase 5: Analysis and evaluation of the problem-solving process. The teacher guides students to analyze and evaluate the student's thinking process in investigating a problem and the intellectual ability used.

Advantages and Disadvantages of *the Problem Based Learning Model*

The advantages of using the Problem Based Learning model are as follows: 1) Students better understand the concepts taught because they are the ones who invented the concepts. 2) Actively engage students in solving problems and demand higher thinking skills of students. 3) Knowledge is embedded based on the schema owned by students, so that learning is more meaningful. 4) Students can experience the benefits of learning, because the problems solved are directly related to real life. This can increase students' motivation and interest in the material they learn. 5) Making students more independent and mature, able to give aspirations and accept the opinions of others, and instilling positive social attitudes with other students ((Sanjaya, 2007).

Meanwhile, the weaknesses of PBL in its application are: if students lack understanding of the material, it will be difficult for students to solve problems, if students do not have confidence that the problems given are difficult, then students will feel reluctant to solve the problem, and this PBL model takes a long time to prepare for it, the implementation of PBL must be adjusted to the existing curriculum load (Abidin, 2013).

C. Research Methods

Type of Research

This research is a Classroom Action Research (CAR), which is research conducted by teachers in their own classrooms through self-reflection, with the aim of improving their performance as teachers, so that activities and learning outcomes increase (Wardhani, 2011). However, the research carried out by the author is in the form of collaborative PTK involving several parties, namely teachers, madrasah heads, LPTK lecturers, and other people involved in a team to conduct research (Sukidin, Basrowi & Suranto, 2010). The research subjects, implementation time, and place of research are as follows: Research Subject

This research was conducted on students of grade IV.B MI. Safinatul Huda Jepara consisting of 22 female students, during the odd semester of the 2022/2023 Academic Year. This research was carried out in three cycles from December 5 to December 26, 2022. The place of research is MI. Safinatul Huda Jepara, chosen because the researcher works in the madrasah, so that it makes it easier to collect data, has wide time opportunities, and research subjects that are very suitable for the researcher's profession. This research is a collaborative classroom action research, designed and implemented by a team consisting of the author as a researcher, the head of the madrasah, and the teacher of grade IV. A as an observer to observe the performance of teachers, LPTK lecturers, and pamong teachers as validators of the validity of research instruments.

Data, Data Types, and Data Sources

1. Data

Data is a fact or figure that can be used as a source of information. The data in this class action research are all facts and figures about the science learning process of students in class IV.B MI. Safinatul Huda Jepara.

2. Data types

The types of data used in this study are 2 (two) types of data, namely:

a) Quantitative data obtained from the results of the post-test in the form of numbers in the science learning process of students in grade IV.B MI. Safinatul Huda Jepara. b) Qualitative data obtained from observations about teacher activities and student activities are used as a basis to describe the success of the implementation of the Problem Based Learning (PBL) model in the learning process. And it is also used as a basis for reflecting and improving learning each cycle. The learning improvement is said to be successful marked by an increase in learning outcomes from cycle 1 to cycle 3.

3. Data Source

The data sources in this study are everything related to the research in order to obtain the data needed for study materials in analyzing data. In this study, the data sources needed are from the results of post tests, documentation data, and observations about teacher activities and student activities in the learning process.

Data Collection Techniques

1. Test

The form of the test used is a formative test form in the form of 3 multiple-choice questions and 2 short fills

2. Non Test

In addition to test techniques, data collection techniques with non-test methods, in the form of: a) Documentation in the form of data collection techniques by collecting and analyzing documents in the form of student group lists and student score lists to describe concretely student activities during the learning process. Furthermore, b) observation to observe the activities of teachers and students during learning activities as supporting data about the process of implementing actions using the *Problem Based Learning* (PBL) model. The implementation of observation was assisted by 2 (two) collaborators, namely: class IV-A teachers and the Head of Madrasah by using an observation sheet to find out the teacher's activities and an observation sheet to find out the activities of the students.

Data Collection Instruments

The instruments used in this study are:

1. Post-test

The instrument for the test method is a post test question given at the end of the learning activity to determine the level of students' ability to understand the teaching material in the learning activities that have been carried out.

2. Non-Test Instruments

Data collection instruments with non-test forms, in the form of: a) Documentation includes: Student Worksheets (LKPD), trial observation sheets, student skill test results report sheets. In addition, the use of video recorders and cameras as tools for taking pictures and videos during the learning process. b) The Observation Sheet used is: student observation sheet, including: attitude observation sheet, skill observation sheet, student behavior observation sheet in the learning process. Meanwhile, the teacher observation sheet includes: teacher lesson plan observation sheet, learning implementation observation sheet.

Data Validation

The validation of this class action research data is through data triangulation by utilizing one data with another data for the purpose of checking or as a comparison.[24] The triangulation techniques used by the researcher include triangulation of data sources

consisting of qualitative data from observation and documentation and quantitative data from test results. Meanwhile, the triangulation of data collection time consists of 3 (three) cycles.

Data Analysis

The researcher analyzed the data by compiling and processing the data collected through test results and observation records. The techniques used for data analysis in this study are descriptive analytical techniques with explanations, namely;

1. Quantitative data in the form of student learning outcomes, namely post tests that can be analyzed descriptively using descriptive statistical analysis. In this study, the calculated score, namely the percentage of classical proficiency, is when the student's learning outcome ≥ 80% of the total number of students in one class gets a score of ≥ 70. After the number of each is known, then it is presented by dividing by the number of students multiplied by 100%. Then the percentage of students who received grades (a) incomplete, and (b) complete.
2. Qualitative data obtained from observations about teacher activities and student activities are used as a basis to describe the success of the application of the Problem Based Learning model in the learning process. And it is also used as a basis for reflecting and improving learning each cycle. The learning improvement is said to be successful marked by an increase in learning outcomes from cycle 1 to cycle 3.

Success Indicators

To evaluate whether there is a positive impact on an action, it is necessary to have success criteria, which are established before the action is carried out. This corrective action is said to be successful characterized by:

a. Individual Success Students are declared complete if they get a learning outcome score of KKM which is ≥ 70, but if the student does not reach KKM < 70 then the student is not complete.
b. The success of the Classical Cycle was declared to have stopped judging from the number of students who were able to reach a minimum of 70 on average. At least 80% of the number of students in the class.

Collaborative PTK Implementation Procedure

The implementation of collaborative PTK is planned to be carried out in three cycles, namely cycles 1, 2 and 3. Learning about the material of the Properties of Light was carried out for six hours of lessons with three meetings. So, each meeting is held 2 x 35 minutes. Each research cycle consists of 4 (four) stages, namely planning, implementation, observation, and reflection. Meanwhile, formative tests are carried out at the end of the meeting in each research cycle. Each research cycle is carried out according to the changes to be achieved. Activities carried out in cycle 1 (one) include:

1. Planning

   Researchers at the planning stage of cycle 1 are as follows: a) Identify problems,b) Prepare lesson plan 1, 3) Prepare teacher and student observation sheets, 4) Prepare assessment instruments for cycle 1.
2. Implementation of Actions

   In the initial activity, the teacher greeted the students, invited them to pray, sang the national song "Bendera Pusaka," took attendance, checked on the students' well-being, reviewed previous lessons with a Q&A session, and conveyed the learning objectives. In the core activities, the teacher followed the syntax of the problem-based learning model: introducing problems, organizing learning, guiding investigations, developing

and presenting works as written reports, analyzing and evaluating problem-solving processes, concluding learning outcomes with the students, reinforcing these conclusions, and administering tests after learning. In closing, the teacher conducted reflection and feedback on the learning outcomes, shared the next lesson plan, and concluded with a prayer and farewell greetings.

3. Observation

The researcher prepares an observation sheet that has been prepared to find out the condition of the classroom, especially the students' enthusiasm for learning in learning. In this study, the results of the observations are then discussed with collaborators to discuss and find solutions to the problems that exist during the learning period.

4. Reflection

Based on the results of the teacher's observation, he can reflect on the improvement of students' learning outcomes in learning science material on the properties of light. In this reflection activity, it will be analyzed whether the activities that have been carried out can improve students' learning achievement in learning science material light properties so that it can be used to determine classroom actions in the next cycle.

Cycle 2 and Cycle 3 are improvements in actions from cycle 1 that have not reached the maximum target or have not been successful. Broadly speaking, the implementation of cycle 2 and cycle 3 is not much different from the implementation of cycle 1, it's just that in cycle 2 and cycle 3 more attention is paid to things that have not been achieved in cycle 1 to be improved to achieve the desired goals.

D. Result

Description of Student Data Per Cycle

1. Cycle I

1.1 Planning

Action planning in Cycle I is: preparing learning materials that will be presented using the PBL learning model and preparing everything that supports the learning process, including Learning Implementation Plans (RPP), Student Worksheets (LKPD), learning media, student evaluation sheets, and observation sheets for collaborative teachers.

1.2 Action

The implementation of teaching and learning activities for cycle I was carried out on December 8, 2022 in Class IV.B with a total of 22 students. In this case, the researcher acts as a teacher, while the observer acts as the head of the madrasah with the assistance of a teacher. The teaching and learning process refers to the lesson plan that has been prepared. Observation is carried out in conjunction with the implementation of teaching and learning. The implementation steps use PBL syntax, namely: Preliminary Activities, Core Activities consisting of 5 (five) phases, ending with Closing Activities.

1.3 Observation

When the first cycle of learning is taking place, the collaborator teacher observes the course of learning by filling out the observation sheets that have been provided, namely: Teacher Learning Activity Observation Sheet and Student Learning Activity Observation Sheet.

The learning results in cycle I are shown in the table below:

Table 4.1: Assessment of Student Evaluation Results Cycle I

It	Student Name	Value	Information
1	Adinda Kirana Fentika	60	Not Finished
2	Afita Muyasaroh	40	Not Finished
3	Aisyah Assyifatu Maharani	80	Complete
4	Anezka Olivia Salsabila	60	Not Finished
5	Anisa Azzahra Ramadhani	100	Complete
6	Azkiyatul dwi Aulia	60	Not Finished
7	Belqis Zulismy	80	Complete
8	Cindy Oktafiani	80	Complete
9	Farah Zafira Febriyani	60	Not Finished
10	Jamilatul Jaziroh	80	Complete
11	Khabibatus Zahroh	80	Complete
12	Milhatur Raihatil Jannah	60	Not Finished
13	Nadia Nazhatul fikrah	80	Complete
14	Nurul Isma	60	Not Finished
15	Reza Khariratun Najwa	80	Complete
16	Sarah Saniyatul Husna	100	Complete
17	Sevina Qorri Aina	80	Complete
18	Siti Maftukha	60	Not Finished
19	Syifau Wwarohmah	80	Complete
20	Villa Dwi Auliya	60	Not Finished
21	Vivi Ariyanti	80	Complete
22	Viola Yuliani	40	Not Finished

Based on Table 4.1, it shows that the average score achieved by students in the first cycle reached 70.9. There are 12 (54.5%) students who have completed their studies, while 10 (45.5%) students have not completed their studies. This first cycle has not classically reached 80% completeness of 5 questions.

1.4 Reflection

Based on the scores obtained in Cycle I, it has not been satisfactory, because classically it has not reached 80% completeness. There are 12 (54.5%) students who have completed their studies, while 10 (45.5%) students have not completed their studies. This is due to several factors, including teachers who are less strict in managing students, the PBL model is not used to being implemented in learning activities. The improvements made include that teachers must be more decisive

and in the learning process it is necessary to give maximum direction to students. The LKPD only contains questions and is available in the form of Student Worksheets (LKS). The improvements made include that teachers must be better and more intense in providing direction on the learning process to students in the classroom.

2. Cycle II

Cycle II is an activity resulting from reflection from cycle I with the same flow starting from planning, action, observation, and reflection which was carried out on December 17, 2022 in Class IV.B with a total of 22 students. So that the following results were obtained:

Table 4.2: Values of Student Evaluation Results Cycle II

It	Student Name	Value	Information
1	Adinda Kirana Fentika	80	Complete
2	Afita Muyasaroh	60	Not Finished
3	Aisyah Assyifatu Maharani	80	Complete
4	Anezka Olivia Salsabila	60	Not Finished
5	Anisa Azzahra Ramadhani	100	Complete
6	Azkiyatul dwi Aulia	60	Not Finished
7	Belqis Zulismy	80	Complete
8	Cindy Oktafiani	80	Complete
9	Farah Zafira Febriyani	80	Complete
10	Jamilatul Jaziroh	100	Complete
11	Khabibatus Zahroh	80	Complete
12	Milhatur Raihatil Jannah	60	Not Finished
13	Nadia Nazhatul fikrah	80	Complete
14	Nurul Isma	60	Not Finished
15	Reza Khariratun Najwa	80	Complete
16	Sarah Saniyatul Husna	100	Complete
17	Sevina Qorri Aina	80	Complete
18	Siti Maftukha	60	Not Finished
19	Syifau Wwarohmah	80	Complete
20	Villa Dwi Auliya	80	Complete
21	Vivi Ariyanti	60	Not Finished
22	Viola Yuliani	40	Not Finished

Based on Table 4.2, it shows that the average score achieved by students in cycle II reached 74.5. There were 14 (63.6%) students who completed their studies, while 8 (36.4%) students who had not completed their studies. so that it can be

concluded in Cycle II classically it has reached 80% completeness of 5 questions.

The results of reflection based on the values obtained in Cycle II have not been satisfactory, because classically it has not reached 80% completeness. However, there has been an increase in learning outcomes from Cycle I. Cycle II produced 14 students (63.6%) who completed their studies, while those who did not complete there were 8 students (36.7%). This is due to several factors, including students starting to play on their own, the PBL model is not used to being implemented in learning activities. The improvements made include paying more attention to students and in learning it is necessary to give maximum direction to students.

3. Cycle III

Cycle III is an activity resulting from reflection from cycle II with the same flow starting from planning, action, observation, and reflection. The implementation of cycle 3 is a strengthening of the implementation of cycle II regarding the application of the PBL model to be able to improve student learning outcomes. So that the following results were obtained:

Table 4.3: Values of Student Evaluation Results Cycle III

It	Student Name	Value	Information
1	Adinda Kirana Fentika	80	Complete
2	Afita Muyasaroh	60	Not Finished
3	Aisyah Assyifatu Maharani	100	Complete
4	Anezka Olivia Salsabila	80	Complete
5	Anisa Azzahra Ramadhani	100	Complete
6	Azkiyatul dwi Aulia	80	Complete
7	Belqis Zulismy	100	Complete
8	Cindy Oktafiani	80	Complete
9	Farah Zafira Febriyani	80	Complete
10	Jamilatul Jaziroh	80	Complete
11	Khabibatus Zahroh	100	Complete
12	Milhatur Raihatil Jannah	80	Complete
13	Nadia Nazhatul fikrah	80	Complete
14	Nurul Isma	80	Complete
15	Reza Khariratun Najwa	100	Complete
16	Sarah Saniyatul Husna	100	Complete
17	Sevina Qorri Aina	100	Complete
18	Siti Maftukha	80	Complete
19	Syifau Wwarohmah	80	Complete
20	Villa Dwi Auliya	80	Complete
21	Vivi Ariyanti	80	Complete
22	Viola Yuliani	60	Not Finished

Based on Table 4.3, it shows that the average score achieved by students in cycle III reached 85.4. There are 20 (90.9%) students who have completed their studies, while 2 (9.1%) students have not completed their studies. This cycle III has classically reached 80% completeness. 2 students who cannot meet the KKM are students who have weaknesses in the process of remembering and longer processing knowledge. Nevertheless, these students still experienced changes with increased learning outcomes from cycle I to cycle III.

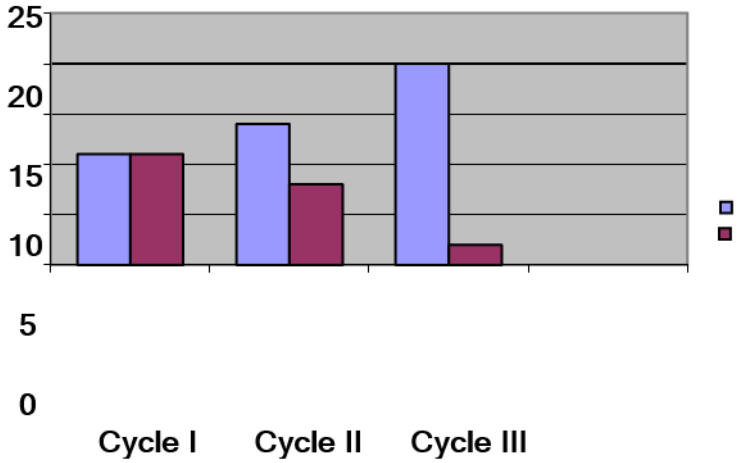
E. Discussion

Based on research, the use of the Problem Based Learning model in the learning process can improve science learning outcomes in grade IV.B MI. Safinatul Huda Jepara. This is because the Problem Based Learning model in the learning process can attract students' attention. In the Problem Based Learning model, teachers invite students to construct understanding independently through several ways described in the phases of the Problem Based Learning model. Teachers can apply various media and teaching aids so that learning is more interesting in delivering material so that students do not feel bored and feel lectured. Teachers in the learning orientation process using image media that are close to students' lives are strengthened with instructional videos that are relevant to the subject matter and direct practice of proving theories so that students feel interested and have a strong interest in learning. A strong sense of interest and interest will foster motivation to learn so that students' understanding is not forced but discovered by the students themselves.

The improvement of student learning outcomes after taking action using the problem-based learning model is proof of the success of the implementation of this learning model. Student learning outcomes in the first cycle were 12 students (54.5%) who had completed their studies and 10 students (45.5%) who had not completed their studies. Based on these results, the research has not been said to be successful so it must carry out Cycle II. Student learning outcomes in the second cycle were obtained data that showed that there were 14 students (63.4%) who had completed their studies and 8 students (36.5%) who had not completed their studies. Student learning outcomes in cycle III were obtained data that showed that there were 20 students (90.9%) who had completed their studies and 2 students (10%) who had not completed their studies.

Based on the analysis data from cycle I to cycle III, it can be concluded that the application of the problem-based learning model in the learning process can improve student learning outcomes, which in this study applies to the science subject of light properties of students in grades IV-B MI. Safinatul Huda Jepara. The discussion can be illustrated in the following diagram;

Figure 4.1 Bar Chart.



Bar Diagram

F. Conclusion

Based on the results of the research that has been presented during the three cycles, the results of all discussions and analyses that have been carried out that the Problem Based Learning learning model can improve the learning outcomes of science material on the properties of light in grade IV MI. Safinatul Huda Jepara for the 2022/2023 Academic Year. The increase in students who completed learning from Cycle I to Cycle II was 9.1% and Cycle II to Cycle III was 27.3%. This can be seen from the achievement of completeness of student learning outcomes in Cycle I has an average of 70.9, Cycle II has an average of 74.5, and Cycle III has an average of 85.4. Students have achieved the KKM classically by 90.9%. Students who have not completed learning in cycle III will be given independent actions in the form of exercises or remedies monitored by teachers so that it is hoped that all students can complete their studies on the material of light properties.

Based on the results of the research, several suggestions were made to make the science teaching and learning process more effective and optimal: students are expected to be active in participating in learning activities, think critically in solving problems, and be more active in exploring knowledge. Teachers are expected to be able to apply the PBL learning model, provide follow-up to students who have not completed it, and conduct research with the same material using learning models other than PBL. Schools should provide guidance to teachers on the application of creative and innovative learning models and can invite students to think critically. Parents are expected to provide guidance to students when learning at home with a learning model that can invite students to think critically.

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