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# The Use of the PBL Learning Model in an Effort to Improve Students' Understanding of Earth's Rotation in Class VI at SD Negeri 3 Wonorejo, Lawang District

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***Abstract*—** *At SD Negeri 3 Wonorejo Lawang, the process of teaching science is still often presented in the form of lectures, and teachers rarely use adequate teaching media or learning resources to explain the concepts of the subject matter.The objective of this research is to enhance students' understanding of Earth's Rotation by using the PBL (Problem Based Learning) teaching model. The purpose of this research is to enhance students' understanding of Earth's Rotation using the PBL (Problem Based Learning) model. This type of research is a classroom action research using a qualitative approach conducted through 2 cycles.The type of research is classroom action research using a qualitative approach conducted through 2 cycles.Cycle 1 has 1 meeting and cycle 2 has 1 meeting.Each cycle consists of the stages of planning, action, observation, and reflection.The subjects of the study are the sixth-grade students of SD Negeri 3 Wonorejo Lawang, totaling 21 students, consisting of 7 male students and 14 female students.The data obtained in this study includes: student learning outcomes taken from evaluation tests, documentation, teacher competency, and student activity in learning taken from observation sheets.Data is analyzed through the stages of reduction, display, and conclusion drawing. It seems there is no text to translate. Please provide the text you'd like me to translate, and I'll be happy to help!The success indicator in this study is: if ≥ 75% of the total number of students are categorized as complete, with the criteria for completion being if the evaluation scores in the learning activities of cycle 1 and cycle 2 are ≥ 75.The results of this study show an average score of 73.3 in cycle 1 and 86.7 in cycle 2.Meanwhile, the percentage of completeness in cycle 1 was 47.6% and in cycle 2 was 85.7%. Meanwhile, the percentage of completeness in cycle 1 was 47.6% and in cycle 2 was 85.7%. Based on the research results and findings above, it shows that the PBL learning model can improve the mastery of science concepts among sixth-grade students at SD Negeri 3 Wonorejo Lawang.Based on the research results and findings above, it shows that the PBL learning model can improve the mastery of science concepts among sixth-grade students at SD Negeri 3 Wonorejo Lawang.Based on the research results and findings above, it shows that the PBL learning model can improve the mastery of science concepts among sixth-grade students at SD Negeri 3 Wonorejo Lawang. The recommendation that can be made is that the implementation of the PBL learning model should be carried out by teachers so that students' understanding of the Earth's rotation can be maximized.The suggestion that can be made is that the implementation of the PBL learning model should be carried out by teachers so that students' understanding of the Earth's rotation can be maximized.*

***Keywords*—***Microsite; PBL Learning, Student Understanding, Earth's Rotation*

## I. INTRODUCTION

Science is a discipline that involves systematically seeking to understand nature, so science is not just the mastery of a collection of knowledge in the form of facts, concepts, and principles, but also a unit of the discovery process.According to (Iskandar, 1997:15), science is observing what happens, understanding what is observed, using new knowledge to predict what will happen, and testing predictions under conditions to see if the predictions are correct.

The objectives of science education in elementary schools (depdiknas, 2003:27) are:

1. Instilling knowledge and scientific concepts that are beneficial in daily life
2. Instilling curiosity and a positive attitude towards science and technology
3. Developing process skills to investigate the environment, solve problems, and make decisions
4. Participate in preserving, maintaining, and conserving the natural environment
5. Developing awareness of the interrelationship between science, environment, technology, and society.
6. Appreciating nature and all its order as one of the creations of God Almighty

There are several benefits to studying science, including: fostering curiosity about the natural environment, providing insights into natural concepts useful in daily life, participating in the preservation, care, management, and conservation of nature, developing the ability to generate ideas about the surrounding natural environment, and cultivating a love for the nature created by God Almighty.

Problem-Based Learning (PBL) is a learning model that emphasizes problem-solving as the main step in the learning process. According to Arends (2012), PBL is a learning approach that challenges students to learn through contextual problems, encourages them to think critically, and develops their problem-solving skills independently. According to Arends (2012), PBL is a learning approach that challenges students to learn through contextual problems, encouraging them to think critically and develop problem-solving skills independently.

PBL consists of several stages, namely:

(1) problem orientation,
(2) independent investigation,
(3) discussion and collaboration,
(4) solution presentation, and
(5) reflection and evaluation (Hmelo-Silver, 2004).

In the context of science education, PBL can help students develop scientific thinking skills and enhance their conceptual understanding of the learning material. The advantages of the Problem Based Learning (PBL) model according to experts include enhancing students' critical, creative, and collaborative thinking skills, as well as helping them develop self-regulated learning skills.PBL also makes education more relevant to real life and trains students to solve problems scientifically.

The advantages of PBL according to experts:

1. Improving Critical, Creative, and Collaborative Thinking Skills:
PBL encourages students to think critically and logically in solving problems, as well as to work together in groups to find solutions.
2. Developing Self-Regulated Learning Skills:
PBL helps students to self-regulate and direct themselves in the learning process, making them more independent and responsible for their own learning.
3. Making Education More Relevant to Real Life:
PBL uses real-life problems as the basis for learning, allowing students to see the relevance between what they learn in school and everyday life.
4. Training Scientific Problem-Solving Skills:
PBL encourages students to identify problems, collect data, formulate hypotheses, and test solutions scientifically.
5. Improving Learning Outcomes:
PBL can improve students' learning outcomes, especially in subjects that require problem-solving skills, such as social studies.
6. Developing Student Independence:
PBL encourages students to actively participate in learning and take responsibility for their own learning process.
7. Forming Intrinsic Rewards:
PBL can motivate students to learn because they feel engaged and interested in the problems they are solving.
8. Improving Collaboration Skills:
PBL encourages students to work together in groups to solve problems, thereby developing their interpersonal and collaboration skills.

Disadvantages of PBL According to Experts:

1. Teachers' Difficulty in Changing Teaching Style:
Teachers may have difficulty transitioning from traditional teaching styles (teacher as the center of information) to more student-centered and problem-solving approaches.
2. Longer Time:

Problem-based learning requires more time for preparation and implementation, both for teachers and students.
Students need time to identify problems, conduct research, and develop solutions.
3. Lack of Self-Confidence and Interest in Learning:
Students who lack self-confidence or have low interest in learning may find it difficult to solve problems and feel reluctant to try.
Failure to solve problems can decrease students' motivation to learn and try again.
4. Not All Materials Are Suitable for PBL:
Some learning materials may not be suitable or difficult to apply with the PBL model, especially more theoretical subjects or those that require memorization.
5. Difficulty in Choosing the Right Problem:
Teachers and students may have difficulty selecting problems that match the students' level of understanding and interest.
The problems presented must be relevant to real life and engaging for the students.
6. Change in Student Roles:
Students need to adapt to the change in their roles from information receivers to problem solvers, which can be a challenge for some students.
7. Changes in Learning Habits:
Students who are accustomed to traditional learning methods (listening, taking notes, memorizing) may have difficulty adapting to more active and independent learning approaches.
8. Need for Additional Material Support:
PBL learning may require additional material support, such as books or reference sources, to help students understand concepts and solve problems.

The concept of Earth's rotation is one of the important topics in the study of Natural Sciences (IPA).The rotation of the Earth refers to the Earth's spinning on its axis, which causes the phenomenon of day and night.However, many students have difficulty understanding this concept because it is abstract and requires a deep understanding of celestial motion (Sadler et al., 2010). However, many students struggle to understand this concept because it is abstract and requires a deep understanding of celestial motion (Sadler et al., 2010). According to research conducted by Trumper (2006), one of the main difficulties students face in understanding the rotation of the Earth is the lack of direct experience and misconceptions that arise from everyday observations.According to research conducted by Trumper (2006), one of the main difficulties students face in understanding the rotation of the Earth is the lack of direct experience and misconceptions that arise from everyday observations.Therefore, a learning approach is needed that encourages students to explore this concept through problem-solving and more in-depth learning experiences.

Several studies show that the use of the PBL model can enhance students' understanding in science education.According to research conducted by Savery (2015), PBL can enhance critical thinking skills and understanding of scientific concepts because students are more active in discovering and constructing their own knowledge. According to research conducted by Savery (2015), PBL can enhance critical thinking skills and understanding of scientific concepts because students are more active in discovering and constructing their own knowledge. Additionally, research conducted by Yew & Schmidt (2009) states that PBL can increase student engagement in learning, improve their ability to connect scientific concepts with real-life situations, and reduce misconceptions that often occur in topics such as the rotation of the Earth.Furthermore, research conducted by Yew & Schmidt (2009) states that PBL can enhance student engagement in learning, improve their ability to connect scientific concepts with real-life situations, and reduce misconceptions that often occur in subjects like Earth's rotation.

## II. METHOD

The purpose of this research is to improve the process and learning outcomes using PBL's method, therefore this research is a classroom action research (CAR).One characteristic of classroom action research is the emergence of awareness in the teacher that the practices they have been conducting in the classroom have problems that need to be resolved.

One of the characteristics of classroom action research is the emergence of the teacher's awareness that the practices they have been conducting in the classroom have problems that need to be resolved. The approach used in this research is a qualitative approach. The approach used in this research is a qualitative approach.The characteristic of the qualitative approach is studying real-world situations naturally, without manipulation, and being open to whatever arises.The data in this research includes:
a. The results of the evaluation test given at the end of each action.
b. The results of the worksheets completed through group discussions.
c. The results of the teacher's performance observation and the observation of student activities filled out by the researcher during the learning process in the classroom.
The data source in this study is the sixth-grade students of SD Negeri 3 Wonorejo Lawang, totaling 21 students, consisting of 14 female students and 7 male students.

## III. RESULTS AND DISCUSSION

1. Cycle 1 Activities

cycle 1, the learning process begins with the teacher conducting a question-and-answer session with the students about the topics to be studied, using clear, concise questions that motivate the students, so that the students answer the questions assertively and their answers align with the questions.Next, the teacher conveys the learning objectives and steps with clear, easily understandable sentences and a logical sequence of language, so that students listen calmly and do not engage in other activities.In explaining the material on Earth's Rotation, the teacher presents the material according to the lesson plan, using clear, easy-to-understand sentences with pauses and intonation in their delivery, so that students listen attentively and do not engage in other activities.Next, the teacher shows several examples of the Earth's rotation in the form of pictures.Then the teacher gave the opportunity to ask questions about the material that was not understood, and many students asked questions.

Then the teacher gave students the opportunity to ask questions about the material they didn't understand, and many students asked questions. The teacher guided the students into several groups by calling out their names according to the attendance list and forming heterogeneous groups so that the students wouldn't be noisy.The teacher guides the students into several groups by calling out their names according to attendance and forming heterogeneous groups so that the students do not make noise.After that, the teacher distributes the worksheets that need to be completed, and the teacher allocates time for the students to work on them so that they do so diligently.But in reality, many students were still joking around, so the allotted time for the task was up, but the students' work was not finished.And finally, it was decided to continue in the second meeting.

It seems that your message is empty. Could you please provide the text you'd like me to translate?The second meeting was held the next day.The learning session began by streamlining the number of group members, which initially consisted of 5-6 students, to 4-5 students per group.This is done to focus the students on their group tasks.After the LKK was distributed, the students immediately began working on their group tasks.Next, the students were given the opportunity to discuss and work on the assignment, and the teacher guided them so that the students could collaborate.Then the teacher gives the opportunity to the group representative to present their results in front of the class, and the teacher asks the other students to be quiet, so the class doesn't become noisy.Next, the teacher gives individual practice questions to the students and explains the questions that the students do not understand well, so that the students can complete them honestly.

Next, the teacher gives individual exercises to the students and explains the questions that the students do not understand so that they complete them honestly. As a conclusion, the teacher guides the students to summarize the material, provides reinforcement and motivation to the students by asking stimulating questions, and gives appreciation to the students with clear intonation and language so that the students are enthusiastic and the classroom atmosphere does not become chaotic.As a conclusion, the teacher guides the students to summarize the material, provides reinforcement and motivation to the students by asking stimulating questions and giving appreciation to the students with clear intonation and language so that the students are enthusiastic and the classroom atmosphere does not become chaotic.

As a conclusion, the teacher guides the students to summarize the material, provides reinforcement and motivation to the students by asking stimulating questions and giving appreciation to the students with clear intonation and language so that the students are enthusiastic and the classroom atmosphere does not become chaotic. In the results of the first cycle of learning, it was obtained that 47.6% (10 students) achieved the KKM score of 75, while 52.4% (11 students) scored below the KKM.In the results of the first cycle of learning, it was found that 47.6% (10 students) achieved scores according to the Minimum Completeness Criteria (KKM) of 75, while 52.4% (11 students) scored below the KKM.This means that improvements are still needed.

Table of student completion in cycle 1 activities

| No | Child Development | Number of Children | Percentage |
|---|---|---|---|
| 1 | Completed | 10 | 47,6 % |
| 2 | Uncompleted | 11 | 52,4 % |

From the table of completeness above, it can be seen that the level of completeness of science learning outcomes has not yet reached the established standard, which is more than 75% of students have achieved the Minimum Completeness Criteria (KKM).This is due to the minimal mastery of the material obtained by the students.

From the table and diagram of completeness above, it can be seen that the level of completeness of science learning outcomes has not yet reached the established standard, which is more than 75% of students have achieved the Minimum Completeness Criteria (KKM).This is due to the minimal mastery of the material obtained by the students.

2. Cycle 2 activities

In cycle 2, in addition to using visual media, the researcher also asked students to create props about the Earth's rotation.The lesson began with the teacher conducting a question-and-answer session with the students about the topics to be studied, using clear, concise questions that motivated the students, so they answered the questions firmly and their answers were in line with the

questions.Next, the teacher conveys the objectives and steps of the lesson with clear sentences, easy to understand, and in a sequential manner so that the students listen calmly and do not engage in other activities.In explaining the Earth's rotation material, the teacher presents the material according to the lesson plan, using clear, easy-to-understand sentences with pauses and intonation in their delivery, so that students listen calmly and do not engage in other activities.Next, the teacher gives students the opportunity to ask questions about the material they do not understand, and many students ask questions.

Next, the teacher gives students the opportunity to ask questions about the material they don't understand, and many students ask questions. The teacher guides the students into several groups by calling out their names according to the attendance list and forming heterogeneous groups so that the students don't make noise.The teacher guides the students into several groups by calling out their names according to the attendance list and forming heterogeneous groups so that the students do not make noise.After that, the teacher asked the students to create a teaching aid about the rotation of the Earth, while distributing the worksheets that needed to be completed, and the teacher allocated time for the task so that the students worked diligently.Next, the students were given the opportunity to discuss and work on the assignment, and the teacher guided them so that the students could collaborate.Then the teacher gives the group representatives the opportunity to present their results in front of the class, and the teacher asks the other students to be quiet, so the class doesn't become noisy.

Then the teacher gave the opportunity for group representatives to present their results in front of the class, and the teacher asked the other students to be quiet, so the class wouldn't become noisy. As a conclusion, the teacher guided the students to summarize the material, provided reinforcement and motivation to the students by asking stimulating questions, and appreciated the students with clear intonation and language so that the students would be enthusiastic and the class atmosphere wouldn't become noisy.As a conclusion, the teacher guides the students to summarize the material, provides reinforcement and motivation to the students by asking stimulating questions and giving appreciation to the students with clear intonation and language so that the students are enthusiastic and the classroom atmosphere does not become chaotic.

As a conclusion, the teacher guides the students to summarize the material, provides reinforcement and motivation to the students by asking stimulating questions and giving appreciation to the students with clear intonation and language so that the students remain enthusiastic and the classroom atmosphere does not become chaotic. From the evaluation results obtained, 85.7% (18 students) are categorized as complete, and only 3 students (14.3%) are categorized as incomplete.

Table of student completion in cycle 2 activities

| No | Child Development | Number of Children | Percentage |
|---|---|---|---|
| 1 | Completed | 18 | 85,7% |
| 2 | Uncompleted | 3 | 14,3% |

From the evaluation results obtained, 85.7% (18 students) are categorized as complete, and only 3 students (14.3%) are categorized as incomplete.This is because the use of the PBL learning model provides a great experience for students, making lessons more concrete and less verbal, incorporating the concept of contextual learning, and making lessons more applicable (students directly apply events/objects in their daily lives).

## IV. CONCLUSION

Based on the presentation of data and discussion in the previous chapter, the conclusion that can be drawn from the use of the PBL learning model is as follows: learning with the PBL model conducted in the sixth grade at SD Negeri 3 Wonorejo Lawang can enhance students' understanding of the Earth's rotation.


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## REFERENCES


[1] Abdulhak, I. (2008).Design and Development of Educational Technology Concepts.The paper was presented at the Educational Technology Development Workshop.Bandung: Universitas Pendidikan Indonesia

[2] Galton, Maurice & Harlen, Wayne (1990).Assessing Science In The Classroom: Observing Activities.Londres. Paul Chapman Publishing, Ltd.

[3] Harlen, Wayne. (1993).Enseñanza y Aprendizaje de la Ciencia Primaria.Londres: Paul Chapman Publishing, Ltd.

[4] SEQIP. (1999).Selected Science Concepts in Elementary Schools.Common Mistakes Encountered and Suggested Solutions.Jakarta: Department of Education and Culture
[5] SEQIP. (2000).Science Teacher's Book for Grades 4, 5, 6.Jakarta: Department of Primary and Secondary Education.
[6] SEQIP. (2000).Science Book for 4th, 5th, and 6th Grade Students.Jakarta: Department of Primary and Secondary Education
[7] Suparno, Suhaenah. 1999.Utilization and Development of Learning Resources for Basic Education.Depdikbud. Jakarta
[8] Sulaeman. Momon. (2002).Closer to Nature.Bandung: Grafindo Media Pratama.
[9] Wibowo, Basuki. 1993.Teaching media: Directorate General of Higher Education. Jakarta.