Journal homepage: *https://ojs3.unpatti.ac.id/index.php/honoli*
DOI: *https://doi.org/10.30598/honoli.6.1.22-33*

Honoli of
Journal Primary Teacher Education

Vol 1 No1 April 2025
Page 22 - 33
ISSN 2775-9415

Improving Learning Outcomes in Integrated Science on the Topic of Force through the Children's Learning in Science Model among Grade IVb Students at Elementary School Negeri Tiakur

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Abstract
This study aims to improve student learning outcomes by implementing the Children's Learning In Science (CLIS) learning model in Class IVb of SD Negeri Tiakur, Moa District, Southwest Maluku Regency. The study used a classroom action research (CAR) method, conducted at the school with 32 students as research participants. Data were collected through observation, documentation, and written tests. The results showed a significant improvement in student learning outcomes. In the initial test, only 12 students (37.5%) achieved the Minimum Mastery Criteria (MMC). After applying the CLIS model in Cycle I, the number of students who met the MMC increased to 19 (59.5%). In Cycle II, all students (100%) successfully achieved scores that met the MMC. This improvement indicates that constructivist-based learning such as CLIS helps students develop a deeper understanding of scientific concepts. Therefore, the CLIS model is highly recommended for use in science learning at the elementary school level. This model also effectively increases students' active participation during the learning process.
Keywords : *children's learning in science, student learning outcomes, science learning.*

INTRODUCTION

Education is a fundamental means of advancing a nation. Through education, a nation can broaden its horizons of knowledge and compete in various fields, including education itself and technological mastery. The use of technology is greatly influenced by the mastery of basic sciences, particularly Natural Sciences (IPA) (Sidik NH. & Winata, 2016). The term "education" originates from the Greek word *pedagogie*, which means guidance for children. According to the Kamus Besar Bahasa Indonesia (Great Dictionary of the Indonesian Language), "pendidikan" (education) is derived from the root word (to educate) with the prefix *pe-* and suffix *-an*, meaning "the act of

educating." In general, education is a process of changing the attitudes and behaviors of individuals or groups in an effort to mature human beings through teaching and training (Awwalin & Rachmadtullah, 2025).

Integrated Science and Social Studies (IPAS) is a field of study that discusses living things, non-living things, and their interactions, including human life in relation to the environment. IPAS is structured logically and systematically, considering cause-and-effect relationships (Alvianita et al., 2020). This subject plays an important role in shaping the Pancasila Student Profile, the ideal standard for Indonesian students. Through IPAS, students are encouraged to be curious about phenomena around them and to understand the relationship between nature and human life on Earth (Herliana et al., 2021).

Learning outcomes are a key indicator of student success in the learning process. These outcomes encompass process skills, active participation, motivation, and academic achievement. According to Kudus (2023), learning outcomes include activeness, motivation, and process skills. Learning outcomes also reflect changes in student behavior that are assessed after learning activities are completed. Every student is expected to achieve optimal learning outcomes, although this success is influenced by various internal and external factors (Khaerunnisa et al., 2022). Internal factors include physical and psychological conditions as well as intrinsic motivation; external factors include the family, school, and community environment. School serves as the main setting for the formation of learning experiences, which involve the curriculum, social relationships, and learning tools and strategies. One key factor is the learning model used (Bashir & Bramastia, 2022).

A learning model is a pattern or design used to guide the learning process effectively and efficiently. It helps teachers plan activities that allow students to understand concepts through direct experience. Ginanjar et al., (2019) state that a learning model is a conceptual framework for organizing systematic learning steps. Darsanianti et al., (2024) add that a learning model is a structured plan to facilitate

teaching materials. Based on expert opinions, a learning model serves as a guide for teachers in conducting classroom instruction, particularly in the IPAS subject.

Based on observations conducted by the researcher on October 29–30, 2024, in Grade IVb of Public Elementary School Tiakur, it was found that the IPAS learning process still faced several obstacles. Students were less active, and the instruction remained teacher-centered. Learning outcomes had not yet met the school's Minimum Mastery Criteria (KKM), which is set at 65. Out of 32 students (16 boys and 16 girls), only 10 students (31.25%) scored ≥65, while 22 students (68.75%) scored below the KKM. This low performance is suspected to be due to the continued use of conventional teaching models and methods. The conventional method, which relies on one-way lecturing, makes students passive and focuses primarily on textbooks, thereby negatively impacting student understanding and engagement.

One learning model considered effective for improving IPAS learning outcomes is the Children's Learning In Science (CLIS) model (Sugandi et al., 2021). The CLIS model aims to enhance students' conceptual understanding of science by connecting their everyday experiences with scientific concepts, thus making the knowledge more meaningful and profound (Rai et al., 2017). This model typically involves the use of tools, materials, or instructional media relevant to the subject matter.

Based on the problems described above, and in order to achieve an active, enjoyable, and indicator-aligned learning process, the researcher is interested in conducting a study titled: Efforts to Improve Learning Outcomes in Integrated Science on the Topic of Force Using the Children's Learning In Science (CLIS) Model among Grade IVb Students at Public Elementary School Tiakur.

METHOD

This research is a classroom action research (CAR) conducted in two cycles, namely Cycle I and Cycle II, carried out at Public Elementary School Tiakur. Classroom action research is a combination of research procedures and concrete actions aimed at

understanding and improving changes in the learning process. The subjects of this study were 32 students from Grade IVb. Data collection techniques were conducted through observation and written tests. This research followed four main stages: (1) planning, (2) implementation, (3) observation, and (4) reflection (Arikunto & Cepi Safrudin Abdul Jabar, 2009).

To assess the data and determine student achievement based on the Minimum Mastery Criteria (KKM) of 65 for the IPAS subject, students are considered to have achieved mastery individually if they score ≥65. To calculate the individual scores of students, the following formula is used:

$$\text{Assessment} = \frac{\text{score achieved}}{\text{total score}} \times 100$$

To calculate the average score obtained by the students, the following formula is used:

$$X = \frac{\sum X}{\sum N}$$

X : Average

∑X : Total of all scores

∑N : Total number of students

By examining student mastery learning outcomes both individually and classically, it can be determined that a student is considered to have achieved mastery if they obtain a minimum score percentage of 65. Meanwhile, classical mastery is achieved when at least 75% of the students in the class have met the minimum criteria. To calculate the percentage of mastery learning, the following formula is used:

$$P = \frac{\sum \text{students who have achieved mastery}}{\sum \text{students}} x100$$

RESULT AND DISCUSSION

The initial data obtained by the researcher served as a baseline for conducting the study. Before implementing the action in Cycle I, a pre-test was first conducted. This pre-test was carried out to gather information on the students' level of mastery

regarding the use of the Children's Learning In Science (CLIS) model on the topic of forces in our surroundings. During the pre-test, the researcher did not yet perform any teaching actions. The initial data before the researcher carried out any actions are as follows:

Table 1. Student Learning Outcomes (Pre-cycle)

No	Student Initials	KKM	Score	Mastery Criteria	
				Achieved Mastery	Not Achieved Mastery
1	A.P. O	65	60		✓
2	A.L	65	70	✓	
3	A.R.P	65	75	✓	
4	A.R.K	65	70	✓	
5	A.N.M	65	60		✓
6	A	65	70	✓	
7	A.M	65	65	✓	
8	A.K	65	50		✓
9	B.S	65	60		✓
10	D.T	65	60		✓
11	D.L	65	65	✓	
12	G.I.K	65	70	✓	
13	G.M	65	75	✓	
14	G.F	65	50		✓
15	G.M	65	75	✓	
16	H.A.S	65	50		✓
17	J.S	65	55		✓
18	J.M.O	65	50		✓
19	J.H.K	65	50		✓
20	K.C.K	65	60		✓
21	L.A.M	65	60		✓
22	M.M.T	65	55		✓
23	N.P	65	60		✓
24	P.D	65	55		✓
25	R.E.A	65	50		✓
26	R.M	65	55		✓
27	S.N.R	65	50		✓
28	S.R	65	70	✓	
29	S.W	65	70	✓	
30	T.L.W	65	50		✓
31	V.V. A	65	70	✓	
32	Y.L	65	60		✓
Total			**1.940**	**12**	**20**
Average			**60,62**		
Percentage				**37,5%**	**62,5%**

Source : Student Learning Outcomes

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Based on the student learning outcomes presented in Table 1, it can be concluded that the students' initial understanding of the topic "Forces Around Us" was still low. This is evident from the average score of 60.62 obtained by 32 students, with only 12 students (37.5%) meeting the Minimum Mastery Criteria (KKM), while 20 students (62.5%) did not meet the KKM. Therefore, it can be concluded that the students' prior knowledge of the IPAS subject—particularly the topic of forces around us—was still very low.

An improvement in learning outcomes was observed in Cycle I, as reflected in the individual scores obtained by the students. However, overall, the increase had not yet reached the predetermined mastery level. This can be seen in Table 2 below.

Table 2. Student Learning Outcomes in Cycle I

No	Student Initials	KKM	Score		Total Score	Mastery Criteria	
			PG	Essay		Achieved Mastery	Not Achieved Mastery
1	A.P.O	65	7	6	65	✓	
2	A.L	65	9	7	80	✓	
3	A.R. P	65	9	9	90	✓	
4	A.R.K	65	8	6	70	✓	
5	A.N.M	65	8	5	65	✓	
6	A	65	8	7	75	✓	
7	A.M	65	6	8	70	✓	
8	A.K	65	6	6	60		✓
9	B.S	65	8	7	75	✓	
10	D.T	65	8	6	70	✓	
11	D.L	65	6	6	60		✓
12	G.I.K	65	9	7	80	✓	
13	G.M	65	9	6	75	✓	
14	G.F	65	6	5	55		✓
15	G.M	65	7	7	70	✓	
16	H.A.S	65	5	6	55		✓
17	J.S	65	6	6	60		✓
18	J.M.O	65	7	3	50		✓
19	J.H.K	65	6	5	55		✓
20	K.C.K	65	7	7	70	✓	
21	L.A.M	65	8	7	75	✓	
22	M.M. T	65	6	6	60		✓
23	N.P	65	8	6	70	✓	
24	P.D	65	6	6	60		✓
25	R.E.A	65	5	6	55		✓

26	R.M	65	5	5	50			✓
27	S.N.R	65	5	7	60			✓
28	S.P	65	8	7	75	✓		
29	S.W	65	8	8	80	✓		
30	T.L.W	65	6	6	60			✓
31	V.V.A	65	9	8	85	✓		
32	Y.L	65	8	7	75	✓		
Total					**2150**	**19**		**13**
Average					**67,18**			
Percentage						**59,5%**		**40,5%**

Source : Student Learning Outcomes

Based on the learning outcomes presented in the table above, it can be stated that students' understanding of the topic "Forces Around Us" in Cycle I using the Children's Learning in Science (CLIS) model improved. Of the 32 fourth-grade students in class IVb, 19 students (59.5%) achieved the Minimum Mastery Criteria (KKM), while 13 students (40.5%) did not meet the KKM. The average score obtained by the students was 67.18.

From this data, it can be concluded that there was an increase in student performance from the pre-cycle to Cycle I. The average score in the pre-cycle was 60.62 with a mastery percentage of 37.5%. After the implementation of Cycle I, the average score rose to 67.18 and the mastery percentage increased to 59.5%. However, since the percentage of students meeting the mastery criteria in Cycle I had not yet reached the desired level, the research was continued to Cycle II.

The learning outcomes in Cycle I were still not optimal. Some shortcomings during the implementation included the teacher not clearly stating the learning objectives, which caused students to lack understanding of what they were supposed to learn. Additionally, the teacher provided limited confirmation or feedback on students' ideas as a follow-up to their understanding. Better guidance is needed to ensure all students receive adequate support. Each student also needs to prepare themselves and actively participate in learning activities to benefit from the application of the CLIS model.

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In Cycle II, improvements were focused on addressing these shortcomings. The results of the Cycle II test can be seen in the table below:

Table 3. Student Learning Outcomes Cycle II

No	Student Initials	KKM	Score		Total Score	Mastery Criteria	
			PG	Essay		Achieved Mastery	Not Achieved Mastery
1	A.P.O	65	8	6	70	✓	
2	A.L	65	9	8	85	✓	
3	A.R. P	65	8	8	80	✓	
4	A.R.K	65	9	8	85	✓	
5	A.N.M	65	8	8	80	✓	
6	A	65	8	7	70	✓	
7	A.M	65	8	8	80	✓	
8	A.K	65	9	8	85	✓	
9	B.S	65	8	6	70	✓	
10	D.T	65	10	10	100	✓	
11	D.L	65	8	6	70	✓	
12	G.I.K	65	9	8	85	✓	
13	G.M	65	8	7	75	✓	
14	G.F	65	8	8	80	✓	
15	G.M	65	9	9	90	✓	
16	H.A.S	65	8	7	75	✓	
17	J.S	65	9	8	85	✓	
18	J.M.O	65	9	6	75	✓	
19	J.H.K	65	9	4	65	✓	
20	K.C.K	65	9	9	90	✓	
21	L.A.M	65	9	8	85	✓	
22	M.M.T	65	8	7	75	✓	
23	N.P	65	8	6	70	✓	
24	P.D	65	8	8	80	✓	
25	R.E.A	65	9	7	75	✓	
26	R.M	65	6	8	70	✓	
27	S.N.R	65	8	7	75	✓	
28	S.R	65	9	8	85	✓	
29	S.W	65	9	7	80	✓	
30	T.L.W	65	9	8	85	✓	
31	V.V.A	65	8	7	75	✓	
32	Y.L	65	9	8	85	✓	
Total					**2525**	**32**	
Average					**78.90**		
Percentage						**100 %**	-

Source : Student Learning Outcomes

Based on the learning outcomes in the table above, it is shown that student mastery in Cycle II indicates that all students achieved the Minimum Mastery Criteria (KKM of 65). A total of 32 students, or 100%, reached the mastery level, with an average score of 78.90.

Thus, the implementation of the Children's Learning in Science (CLIS) model has led to an improvement in student learning outcomes compared to the results before the intervention. The evaluation test results in Cycle II show that all 32 students, or 100%, achieved mastery. Based on the success indicator, which requires at least 75% of students to score above the KKM (65), it can be concluded that the learning outcomes in Cycle II have met the success criteria established by the researcher.

In Cycle I, students learned the topic *Forces Around Us*. In the first meeting, they studied *The Effects of Force on Objects*. During the orientation stage, students were introduced to real-life situations involving force, such as pushing or pulling objects. In the elicitation of ideas stage, the teacher asked questions about what happens when an object is acted upon by a force. During the restructuring of ideas stage, students discussed the various effects of force on objects. In the application of ideas stage, students conducted experiments to observe the effects of force, such as rolling a ball. In the second meeting, students learned about *Magnets: The Magical Objects*. They observed magnetic phenomena in everyday life, discussed the properties of magnets, and conducted experiments to identify objects attracted by magnets and to study magnetic poles. In the consolidation stage, students presented their findings and summarized the concepts they had learned.

The learning process using the Children's Learning in Science (CLIS) model created an effective and enjoyable learning environment, as students were actively engaged and given the opportunity to discover new concepts independently, making them feel like real scientists. Although there was an improvement in learning outcomes, the mastery percentage had not yet reached the target of 75%, so further action was needed in Cycle II.

The learning outcomes in Cycle I were still not optimal. Some weaknesses in the implementation included the teacher not clearly stating the learning objectives, which led to students having difficulty understanding what they needed to learn. In addition, the teacher did not sufficiently confirm students' ideas as a follow-up to their understanding. Better guidance was needed to ensure that all students received adequate support. Each student also needed to prepare themselves and actively participate in learning activities to benefit from the CLIS model.

In Cycle II, students studied *Elastic Objects* in the first meeting and *Why Don't We Float? (Gravitational Force)* in the second meeting. In the first meeting, they learned about the properties of elastic objects. During the orientation stage, they were introduced to various elastic materials. In the elicitation of ideas stage, the teacher asked why some objects return to their original shape after being stretched. In the restructuring stage, students discussed factors influencing elasticity. In the application stage, they performed experiments using rubber bands, springs, and plasticine to test elasticity. In the consolidation stage, students presented their experiment results.

In the second meeting, students learned about gravitational force. In the orientation stage, they observed objects falling to the ground. In the elicitation of ideas stage, the teacher asked why objects always fall downward. In the restructuring stage, students discussed the concept of gravitational force. In the application stage, they conducted simple experiments, such as dropping objects of different shapes to observe the effects of gravity. In the consolidation stage, students concluded that gravity keeps objects on the surface of the Earth. Therefore, the CLIS learning model proved to be effective in improving students' learning outcomes.

CONCLUSION

The use of the CLIS model in IPAS learning for Grade IVb students at SD Negeri Tiakur showed positive results. The research, conducted in two cycles, revealed an improvement in learning outcomes, as measured by the average scores of the final

tests. Through the analysis of test results, improvement steps were designed for the subsequent cycle. The main objective of using the CLIS model in this study was to improve students' learning outcomes in the IPAS subject. In Cycle I, 19 students achieved the Minimum Mastery Criterion (KKM) with an average score of 67.18. In Cycle II, 32 students achieved the KKM, with the average score increasing to 78.90. These results demonstrate that the implementation of the Children's Learning in Science (CLIS) model had a positive impact on IPAS learning at SD Negeri Tiakur. Moreover, this study successfully achieved its targeted goals, namely fulfilling the minimum mastery criterion of 65 and reaching the success indicator of 75% of the students in the class.

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