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ELEMENTARY SCHOOL STUDENTS' CRITICAL THINKING SKILLS THROUGH FOOD CHAIN LEARNING INDICATORS

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Abstract
Natural and Social Sciences (IPAS) learning requires analytical and problem-solving skills through concrete experiences. Problem-solving skills, as part of higher-order thinking, are highly dependent on students' critical thinking skills. This study aims to scientifically analyze the profile of students' critical thinking skills on food chain material at SDN Kwaron 1. This type of research is descriptive quantitative. The research subjects consisted of 23 Phase C students at SDN Kwaron 1. The data collection instruments used written tests to measure critical thinking skills and material comprehension questionnaires. Data analysis techniques were carried out descriptively and quantitatively to provide an objective picture of student achievement. The results showed that students' critical thinking skills were very low. Based on supporting data, 61% of students did not understand the concept of the food chain well. These findings provide empirical evidence of the need to improve critical thinking skills in science education, especially in food chain material in elementary schools.
Keywords: *Critical Thinking; Science Learning; Food Chain; Elementary School; Observation*

Abstrak
Pembelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS) menuntut kemampuan analisis dan pemecahan masalah melalui pengalaman konkret. Kemampuan pemecahan masalah sebagai bagian dari berpikir tingkat tinggi sangat bergantung pada keterampilan berpikir kritis siswa. Penelitian ini bertujuan untuk menganalisis secara ilmiah profil keterampilan berpikir kritis siswa pada materi rantai makanan di SDN Kwaron 1. Jenis penelitian ini adalah deskriptif kuantitatif. Subjek penelitian terdiri dari 23 siswa Fase C di SDN Kwaron 1. Instrumen pengumpulan data menggunakan tes tulis untuk mengukur kemampuan berpikir kritis dan angket pemahaman materi. Teknik analisis data dilakukan secara deskriptif kuantitatif untuk memberikan gambaran objektif mengenai capaian siswa. Hasil penelitian menunjukkan bahwa keterampilan berpikir kritis siswa tergolong sangat rendah. Berdasarkan data pendukung, sebanyak 61% siswa belum memahami konsep rantai makanan dengan baik. Temuan ini menjadi bukti empiris perlunya upaya peningkatan keterampilan berpikir kritis dalam pembelajaran IPAS, khususnya pada materi rantai makanan di sekolah dasar.
Kata Kunci: Berpikir kritis; Pembelajaran IPAS; Rantai makanan; Sekolah Dasar; Observasi

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Introduction

Science education in the 21st century demands competencies that go beyond mere rote memorization, prioritizing high-level skills such as critical thinking (Hadisaputra et al., 2019). Critical thinking is a systematic process of examining ideas, analyzing evidence, and utilizing logic to achieve accountable results (Asrean Hendi & Caswita, 2020). In the context of elementary education, students demonstrate these skills when they observe, hypothesize, conduct experiments, and communicate reasoning effectively (Maryam et al., 2020; Kinanti & Istianah, 2022). Essentially, critical thinking involves a synthesis of cognitive and metacognitive abilities, including identifying information, evaluating various perspectives, and selecting

appropriate strategies to solve complex problems (Nubita & Istianah, 2024; Putri & Prahani, 2024).

The integration of critical thinking is particularly vital in science learning, which is inherently linked to phenomena and the natural environment (Legina & Sari, 2022). In elementary schools, science serves as a platform for students to engage with concrete experiences through scientific proof and direct practice. Specifically, the "food chain" topic requires students to move beyond identifying "who eats whom" to analyzing the complex interdependence within an ecosystem. However, current instructional practices often rely on basic questioning as a benchmark for understanding, failing to challenge students with the in-depth inquiry necessary to foster sharp and responsive thinking.

Despite its importance, a significant gap remains in science education research at the elementary level. Most existing studies focus on conceptual understanding and memorization, while research specifically examining the holistic profile of students' critical thinking within the context of the food chain is remarkably limited. There is a lack of depth in mapping how students interact with food chain material contextually and how they apply their analytical skills to solve environmental problems. This creates a disconnect between the 21st-century curriculum goals and the actual classroom diagnostic data available to educators.

This study addresses this gap by analyzing the profile of students' critical thinking skills on food chain material at SDN Kwaron 1. The research offers an innovation by developing a specific and measurable profile that integrates cognitive and metacognitive aspects. By identifying these critical thinking patterns, this study provides an empirical basis for teachers to design more effective, needs-based learning strategies. Ultimately, the findings serve as a foundation for improving the quality of science education and supporting the development of innovative, skills-oriented curricula in elementary schools

Research Method

This study employs a quantitative descriptive design to systematically map and describe the critical thinking profiles of elementary school students regarding food chain material. This approach provides an objective and clear representation of students' cognitive abilities at a specific point in time.

Participants The subjects were 23 students in Phase C (elementary level) at SDN Kwaron 1. The participants were selected using a purposive sampling technique, based on the criteria that they had completed the instructional unit on ecosystems and food chains, and represented a specific developmental stage where higher-order thinking skills begin to formalize.

The results of the validation were processed using SPSS version 25 to determine the validity of the instrument. The validated instrument was then distributed to students. Data collection used a written test to measure students' critical thinking skills. Data analysis was performed using quantitative descriptive methods by looking at the results of the students' written tests. The written test results can be categorized in the following table:

Table 1. Critical thinking ability score range

Score range	Category
$75 < \text{score} \leq 100$	High
$45 < \text{score} \leq 75$	Medium
$\text{Score} \leq 45$	Low

Jurnal Cakrawala Pendas Vol. 12, No. 1, January 2026, pp. 141-147

The research method is as follows: (1) The researcher conducted a literature study (2) the researcher focused on searching for assessments and indicators of students' critical thinking skills (3) the researcher created a test instrument for students' critical thinking skills on food chain material (4) the researcher conducted a trial (5) The researcher used the critical thinking test instrument to assess 23 students on food chain material (6) The researcher conducted an analysis based on the results of the instrument and drew conclusions.

Results and Discussion

This study aims to evaluate critical thinking skills in elementary school students. The test was administered in the form of a written exam consisting of six essay questions related to critical thinking. The indicators used were interpretation, analysis, inference, and evaluation. To answer the questions, students had to analyze data, evaluate possibilities, and draw conclusions through solutions appropriate to the questions.

The results of the instrument validation for the critical thinking test are shown in Table 2. The validation sheet aims to determine the level of instrument validity. The validation sheet used in this study is a non-test assessment, where respondents choose answers from a checklist containing questions to obtain an assessment from validators using a validation scale carried out by experts in their fields. In this case, the validators are three teachers. The validation results are calculated using SPSS version 25 with the following results.

Table 2. Validation and reliability results of the critical thinking skills test instrument

Aspect	Validation indicator	Assessment			Criteria	R
		N	r-table	r-count		
Materia	Alignment of test materials with learning outcomes	3	0.9969	1.000	Valid	√
	The accuracy of scientific concepts/facts in questions and answer guidelines	3	0.9969	1.000	Valid	√
	The level of difficulty of the questions is in line with the cognitive abilities of the students.	3	0.9969	1.000	Valid	√
	The quality of stimuli (cases/situations) used in questions is relevant to students' daily lives.	3	0.9969	1.000	Valid	√
critical thinking	Questions measuring accurate	3	0.9969	1.000	Valid	√

Aspect	Validation indicator	Assessment			Criteria	R
		N	r-table	r-count		
	interpretation/analysis skills					
	Questions measuring the ability to infer/draw conclusions accurately	3	0.9969	1.000	Valid	√
	Questions measuring the ability to evaluate/draw conclusions accurately	3	0.9969	1.000	Valid	√
	The answer key guidelines support all three critical thinking indicators	3	0.9969	1.000	Valid	√
	The assessment rubric reflects levels of critical thinking	3	0.9969	1.000	Valid	√
Bahasa	The questions use communicative, standard, and straightforward language.	3	0.9969	1.000	Valid	√
	The questions/instructions in the questions are clear and do not have multiple meanings.	3	0.9969	1.000	Valid	√
	The grammar and spelling throughout the instrument are correct.	3	0.9969	1.000	Valid	√

Table 2 shows that students at Kwaron 1 Public Elementary School have low critical thinking skills in food chain material. Only 4 students were assessed as high. This indicates that not all students achieved mastery in critical thinking skills in food chain material.

The average pre-test scores indicate that students at Kwaron 1 Public Elementary School have low critical thinking skills. Table 3 shows the critical thinking skills test results for Kwaron 1 Public Elementary School on the subject of food chains.

Table 3. Student score results

Jurnal Cakrawala Pendas Vol. 12, No. 1, January 2026, pp. 141-147

	Nilai	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20	8	34.8	34.8	34.8
	27	1	4.3	4.3	39.1
	28	4	17.4	17.4	56.5
	40	1	4.3	4.3	60.9
	45	1	4.3	4.3	65.2
	57	3	13.0	13.0	78.3
	67	1	4.3	4.3	82.6
	78	1	4.3	4.3	87.0
	95	2	8.7	8.7	95.7
	98	1	4.3	4.3	100.0
		23	100.0	100.0	

Based on Table 3,

The findings of this study reveal that the critical thinking skills of students at SDN Kwaron 1 on the topic of food chains are predominantly in the low category, with 61% of students falling into this group. Only a small fraction of students (18%) achieved a high category, while 21% were in the medium category. This descriptive data indicates a significant gap between the expected 21st-century competencies and the actual cognitive performance of students in science learning.

The low average score is closely linked to students' performance across the four critical thinking indicators: interpretation, analysis, inference, and evaluation. Based on the test results, students showed the greatest difficulty in the inference and evaluation stages. In the food chain material, students were generally able to identify components (interpretation), but struggled when asked to predict the impact of removing one organism from the chain (inference) or assessing the balance of an ecosystem based on a given case (evaluation). This aligns with the characteristic of critical thinking as a high-level process that requires not just knowledge of facts, but the ability to draw logical conclusions and justify decisions (Asrean Hendi & Caswita, 2020; Elmi Yanti & Masmelda Utari, 2024).

The high percentage of students in the low category (61%) suggests that students are still transitioning from rote memorization to analytical thinking. In science education, especially regarding ecological themes like food chains, students often perceive the material as a linear sequence rather than a complex web of interactions. This lack of depth in understanding prevents them from criticizing phenomena or evaluating environmental shifts from their own point of view, which are essential steps in the critical thinking process (Saputri, 2020).

Furthermore, the results imply a need for a shift in instructional delivery. While this study focused on profiling, the findings suggest that the current reliance on basic questioning and conventional media may not be sufficient to stimulate higher-order thinking. To bridge this gap, integrating interactive and visual-audio media—such as digital simulations of ecosystems—could potentially accommodate students' learning preferences and increase their engagement in solving complex problems (Supriadi & Hignasari, 2019; Putri et al., 2024). Developing these skills from an early age is a formal responsibility of educational institutions to ensure students can navigate real-world challenges effectively (Lieung Wong Karlina, 2019).

This study is limited by its small sample size (23 students) and its focus on a single subject matter (food chains). Additionally, while the study identifies a low profile of critical

thinking, it does not experimentally test a specific intervention to improve these scores. Future research should consider a larger, more diverse sample and explore the implementation of specific models, such as Problem-Based Learning (PBL) or Inquiry-Based Learning, supported by interactive media to specifically target the indicators where students performed weakest, such as inference and evaluation.

Conclusion

Based on the results of the study, it can be concluded that the critical thinking skills of fifth-grade students at SDN Kwaron 1 in the subject of food chains are still very low, as evidenced by the dominance of students in the low category at 61%, while the medium category is only 21% and the high category is 18%. These findings indicate that students have not optimally achieved critical thinking indicators, especially in the aspects of analysis and evaluation, confirming that science learning at the elementary level still tends to be concept memorization (LOTS) rather than critical reasoning. These results provide practical contributions for teachers and curriculum developers in filling the literature gap on critical thinking profiles in elementary schools, as well as a basis for integrating active learning models. However, this study has limitations because it only involved 23 students in one school, used a single instrument in the form of an essay test without in-depth observation, and did not comprehensively analyze external factors. Therefore, further research needs to be directed at developing innovative learning media or problem-based learning modules with a broader population coverage to improve weak critical thinking indicators.

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