

The Application of A Simple Ice Cream Experiment to Improve The Understanding of The Students' Concepts of SDN 3 Sawahan on The Changing Form of Objects

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ABSTRACT

Teaching without using learning media makes it difficult for students to understand knowledge. This is because students only listen to explanations from the teacher theoretically without any direct learning experience. As a result, the student's understanding of a material tends to be lower. This research was conducted to increase students' conceptual understanding of SDN 3 Sawahan on changes in the shape of objects through a simple ice cream experiment. This study uses qualitative methods with data collection techniques through questionnaires and documentation. The subjects in this study were students in grades 4, 5, and 6 from SDN 3 Sawahan, with a total of 55. The data obtained were analyzed using percentages and diagrams to determine the level of students' understanding of concepts. The results showed that most students understood the concept of changing the shape of objects through a simple ice cream experiment. Students tend to more easily understand concepts in a material through a direct experience such as experiments.

INTRODUCTION

One of the subjects taught in elementary schools is Natural Sciences (IPA). In science lessons, there are lots of material concepts that must be understood, not just memorized. One of the materials in science learning is changes in the shape of objects. In science learning, apart from understanding the concept of the material being taught, a teacher must be able to choose a learning model that is suitable for students so that students can understand and apply the concept of the material that has been taught. Generally, learning in elementary schools, one at SDN 3 Sawahan, tends to be teacher-centered or Teacher Oriented. Learning like this certainly does not empower students and tends to make students bored. This is because students only listen to explanations from the teacher and theoretically read printed books. As a result, students need help understanding the concept of the material being taught.

Conceptual understanding can be interpreted if students can understand the relationship between new knowledge added to previous knowledge (Merdiana, 2016). The understanding indicators cover seven cognitive processes: interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining. Students are interpreted to understand the concept of a material being taught if they can do these things.

In previous research, it was argued that the achievement of learning outcomes could be seen from students being able to recognize various simple concepts in everyday life (Norhafizah & Amelia, 2017). The application of experiments in learning can help improve students' understanding of concepts because, in experimental activities, more emphasis is placed on process performance and product performance (Sartika, 2012). Experimental activities can train students to find scientific facts through experiments. Students become more interested during experimental activities because students are curious about what scientific facts or events will occur in the experiment.

However, in reality, very few elementary schools implement experiments in learning. As a result, science learning is only through delivering material, assignments, and questions and answers. So that students' knowledge of science learning is limited to reference books. The implication is that it can result in a low student understanding of a material concept. Even though experimental activities do not have to require expensive or good tools and materials, they can use simple tools and materials because the most crucial thing in this activity is the process and results obtained by students.

Based on the results of observations in grades 4, 5, and 6 of SDN 3 Sawahan, experimental activities that students can carry out independently are rarely carried out or seldom. So that when students are asked questions related to a material, one of which is material changes in form, some still need help answering. So it is assumed that students' understanding of SDN 3 Sawahan regarding the material changes in the form of objects still needs improvement.

The alternative solution to the problem above is the application of simple experiments in science learning on material changes in shape through simple ice cream experiments to increase students' understanding of concepts. The application of experiments can make students play an active role in learning. Students can analyze, prove and draw conclusions about an event or scientific process they experience in an experiment. Learning with this model can also encourage students' interest in learning and make them like it.

METHOD

Activity Preparation

Based on the results of the initial tests conducted on students in grades 4, 5, and 6 of SDN 3 Sawahan regarding the understanding of the concept of changes in shape with a total of 55 students, it was found that the majority of students were still confused about distinguishing the changes in shape experienced by an object. This is undoubtedly a challenge for educators. Experiments can be applied as a solution to increase students' understanding of SDN 3 Sawahan regarding material changes in the shape of objects. One of the experiments that can be applied is a simple ice cream experiment. Students can carry out this experiment independently because it uses tools and materials often encountered with practical steps that are relatively easy to carry out.

In this activity, students in grades 4, 5, and 6 will be gathered in the schoolyard after school. Before the experiment begins, students are lined up and given instructions related to the experiment, namely the introduction of tools and materials, short questions related to material changes in the shape of objects, and steps to carry out experiments. After that, each class will be divided into two groups to take turns doing the experiment, which starts from grade 4 first. The tools and materials needed for this experiment are ice cubes, liquid milk, salt, wafer cans, and basins. Each experiment step was carried out alternately by students from each group so that all students could be directly involved. After the experiment is completed, students will be given a questionnaire containing statements related to the experiments that have been carried out. Students are required to answer true or false by ticking the column. This questionnaire is used as a benchmark for students' understanding of the material changes in the shape of objects after a simple ice cream experiment is carried out.

Activity Steps

This experiment began with preparing tools and materials such as ice cubes, liquid milk, salt, wafer cans, and buckets/basins. The first step is to break the ice cubes into smaller pieces, then put them in the basin. After that, sprinkle salt into the basin. In this experiment, the salt lowers the ice cubes' freezing point. Thus, the ice cubes cannot melt quickly. This will make the ice cream freeze faster and form ice crystals. If salt has been added to the ice cubes, the wafer tin can be placed in a basin containing the ice cubes and salt. Then put 125 ml of liquid milk into the can. The amount of liquid milk can be adjusted as needed. If much liquid milk is used, forming ice cream will take longer and vice versa. After that, close the wafer can and rotate the wafer can for about 15 minutes. The liquid milk will turn into ice crystals, and the longer it will solidify into ice cream. Through this experiment, it was possible to study the change in state from liquid to solid by changing liquid milk to ice cream.

IMPLEMENTATION

This research used simple ice cream experimental tools and materials, research sites, and questionnaires on students' understanding levels. The research was conducted at SDN 3 Sawahan. This research was implemented at each grade level of students. Students who are used as benchmarks are students in grades 4, 5, and 6 because science is only being taught in this class. The result of this study is the response in the form of students' understanding level.

This research is a type of classroom action research with implementation in 1 research cycle. In the research cycle, there are four stages, namely stages of preparation, implementation, observation, and reflection. This research was conducted at SDN 3 Sawahan in an odd semester in the 2022/2023 academic year. The subjects of this study were 55 students in grades 4,5, and 6 of SDN 3 Sawahan. In this study, the data was collected using test and non-test methods. The test method was carried out by distributing a questionnaire containing several statements about the simple ice cream experiment. Students were required to answer these statements by ticking the true or false column. The non-test method is carried out by carrying out observations and documentation. Observations were made to determine the level of student activity during the experiment.

The data obtained were analyzed using descriptive statistical analysis techniques, namely by finding the average level of students' understanding of the material changes in the shape of objects obtained from questionnaires. The resulting data from the questionnaire is then made in percentages and diagrams to facilitate analysis. The result data is in the form of student answers in the questionnaire, namely the number of students who answered all correctly, students with two correct answers, and students with one correct answer. These results are then converted into percentages to determine the high and low levels of students' understanding of material changes in the form of objects. This research is successful if the percentage of students' understanding level reaches 85%.

RESULT AND DISCUSSION

This research was conducted with one cycle, which contained four stages. Data collection techniques in this study were used to test and non-test methods. The test method was used to determine the level of students' understanding of the material changes in the shape of objects through a simple ice cream experiment. In contrast, the non-test method, carried out employing observation, is used to determine the level of student understanding before the experimental activity takes place and student activity during the activity. The activity began with a brief question and answered about the matter of changing the shape of objects and an explanation of the simple ice cream experiment. Then proceed with instructions for conducting experiments. Students carry out experiments alternately so that each student plays an active role in experimental activities. Based on the observations made before the experimental activities took place, it was known that students' understanding of the material changes in the shape of objects was relatively low. This is shown by the answers that students gave when asked questions regarding the material changes in the shape of objects, some of them answered doubtfully. After the experiment, students were given a questionnaire containing statements related to the material changes in the shape of objects. From the data obtained, the majority of students answered the questions correctly. The results of the data obtained are as follows.

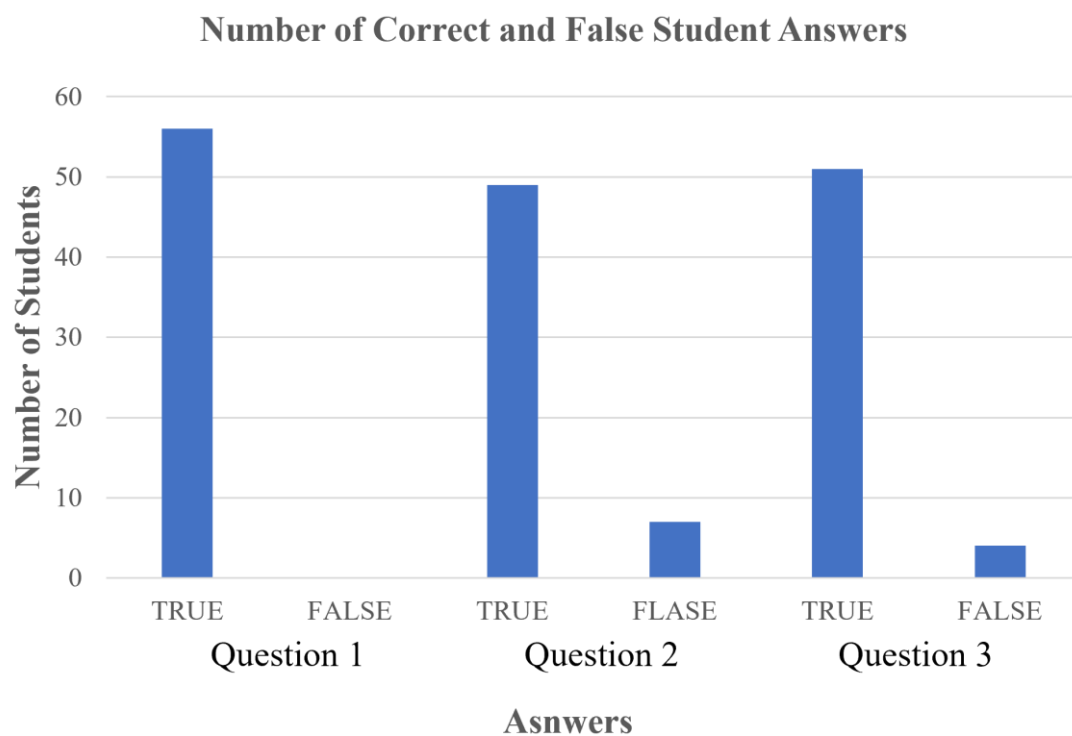


Figure 1. Chart of the number of correct or incorrect student answers

Based on Figure 1, it can be seen that the number of students who answered the three statements correctly was 48 students. The data on the number of correct student answers shows that the percentage of students' understanding is 87.27%. This percentage exceeds the average determined in this study. During the activity, the students were enthusiastic about carrying out experimental activities. Students also look more active and become more curious, discussing in groups, and the established collaboration makes the learning

atmosphere more effective. So it is known that applying the experimental method to material changes in the form of objects can increase students' understanding of concepts. However, it can be seen that seven students still need to answer the questions correctly. Thus, further action is needed to improve their conceptual understanding of the material.

The results obtained from this study indicate that the application of experiments in learning can improve students' understanding of concepts related to material, making it feasible to apply to learning in elementary schools. Experimental activities can also train students to reconstruct their knowledge independently (Khalida, B.R. and Astawan, I.G., 2021). The experimental activity involves students' active role, which invites them to conduct experiments directly. In experimental activities to obtain a theory, students observe, observe, record, and communicate independently (Fitriani, 2019; Hastuti & Hidayati, 2018). Science learning is learning that is closely related to experiments. This is because science students must understand phenomena in the surrounding environment. Science learning teaches students to think systematically and critically to understand the material.

The application of experiments in learning follows the characteristics of elementary school students because, in the age range, elementary schools enter the concrete operational development stage (Latifa, 2017). At this stage, students can think logically, apply it in a natural or concrete form, and understand the concept of cause and effect to know how to change an object (Basri, 2018; Khaulani et al., 2020). The development of students like this needs to be trained and improved by implementing experiments in learning, which will make learning focused on students (student-centered) (Bujuri, 2018). In previous studies, the application of experimental methods in learning helped improve science learning outcomes (Khalida & Astawan, 2021). Other research also suggests that the simple experimental method of making ice cream can also develop students' cognitive development (Norhafizah & Amelia, 2017) as well as research showing results that the use of experimental methods in learning science can improve science learning outcomes fourth-grade elementary school students (Oma, 2021). Based on the results of the research supported by some of the results of previous research, the application of experiments in learning changes in the shape of objects will increase students' understanding of concepts at SDN 3 Sawahan. The change in the form of objects is a branch of material from science lessons.

CONCLUSION

Applying a simple ice cream experiment to learning changes in the shape of objects can increase students' understanding of SDN 3 Sawahan. This can be seen from the number and percentage of students who answered the questionnaire correctly and the active role of students during the activity. Where before the experimental activity took place, according to the results of observations, the majority of students looked doubtful and confused when asked questions related to material changes in the shape of objects. Then after the experimental activity, students' understanding of concepts related to the material increased. This was indicated by the percentage of all students' correct answers of 87.27%. So in this study, applying experiments in learning is very suitable for elementary schools. The applied experiments do not have to be complicated but can be simple, such as ice cream experiments.

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