

# STUDENT'S PHYSICS ACHIEVEMENT THROUGH GASING PHYSICS LEARNING

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**Abstract.** This article describes physics achievement of students after they had learned physics through GASING physics learning. They were students who had low physics achievement score and did not like physics. Through GASING physics learning, they learned physics using simple digit and the physics equation was described by sketch. Their physics achievement of pretest were on low category and after they had learned through GASING they were on high score category. Student response of learning physics before learning by GASING was very difficult but after they had learned through GASING physics learning they thought more easy than before.

Keywords: physics achievement, student's response, GASING physics learning

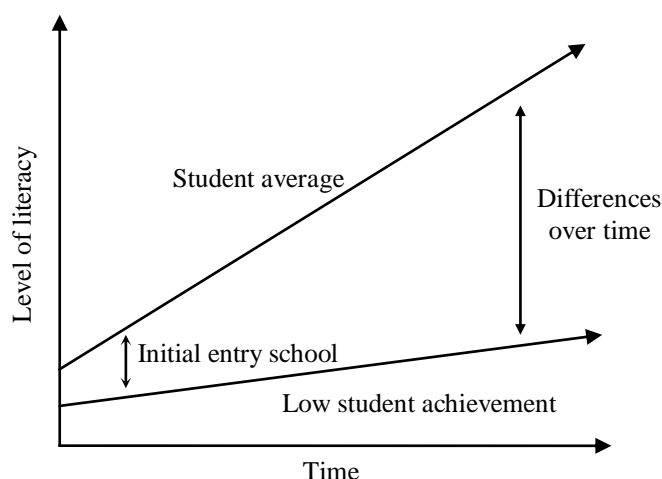
## INTRODUCTION

Physics is a subject that is very exciting because it explains the various phenomena that can be encountered in everyday life. Learning physics that begins with the question, related to customs or phenomena that can be encountered students, then they will try to put forward arguments related to the question. But when students are given questions in the form of numbers and magnitudes of physics, then only one or two students are able to answer in one class. Surely it would appear our minds the question, why students always difficulty in answering the questions of physics. And one of the answer to that question is the problems of manipulation of mathematical variables. To complete a physics problem, which needs to be done by the students is changing the equation corresponding variables to be determined. And this is difficult for students

The author had made some observations on 100 students of class X SMAN 1 Tinambung about students' mathematical abilities in manipulating three variables physics. And the result was very surprising because only 10 of the 100 students who can answer correctly. If this problem was not resolved, the more material the students learned physics, it will be increasingly difficult for them to understand even physics will eventually become the most difficult subjects for students. This not only occurred in physics, but also on the literacy skills of students. Here is an overview of how the relationship between the literacy skills of time to gain time

The above picture explains how the literacy skills of students in terms of overtime. And it turned literacy student achievement even further away from the average score was expected. The above description was similar happened in physics capabilities of students. The higher the education level, the higher the students' cognitive level that must be achieved in learning physics.

But the reality was when students were expected to arrive on the ability to analyze, it turned out most students only up to the level of understanding, may even be at the level of memory



**FIGURE 1.** The relationship between the level of literacy of students. Adapted from Gray, 1980 (Axford et al., 2009)

Each student had challenges in various aspects of life, but for the academic challenges or inability of students in learning, the school can be a source of daily frustration of students. When the school was only a challenge monotonous, there will be a decline in motivation, increased pressure and stress. Whether students should feel like this every day. It is easy for students to give up when they assume that it is unlikely the lesson can be understood or solved. When they consider the possibility of success a bit, then students tend to break away, lose hope and give up (McDonald, 2009)

Knowing the biggest problem for the students to follow the lessons of physics, the authors conducted research to gather 10 students who did not like physics and asking teachers to teach them by using GASING physics learning. GASING is an acronym of the word easy, fun, and enjoyable. On GASING physics learning, students will learn physics by using a simple number that is easily resolved, and the use of scaffolding in the form of sketches to understand the physical quantities that appear in the equation.

One of the subjects in physics that uses a lot of mathematical variables is kinematics. The mathematical equation that exist in such material is linear equations, quadratic equations, even the substitution of more than 2 equation. Here is the equation :

$$v = \frac{s}{t};$$

$$s = v_0 t + \frac{1}{2} a t^2; \quad (2)$$

$$v_t^2 = v_0^2 + 2a \quad (3)$$

In general, students did not like the physics as problem-solving solutions always using mathematical equations like the above. It was coupled with numbers that were difficult to be resolved. The solution that can be used to overcome this problem was by using simple math.

Surya in Rusli (2015) explains how to teach the material speed using the illustration as follows: speed is the change in displacement per unit time (seconds). For example, an object moved at a speed of 2 m / sec. This means that the object is moved as far as 2 meters per second. 1 second moving 2 meters, 2 second moving 4 meters, 3 seconds, moving 6 meters with the following illustration.

The illustrations (Figure 2), can be developed in some of the problems encountered at the high school level physics, such as the motion of the two objects are pursuing and the motion of objects that are facing each other.

Consider the following figure, two cyclists move in opposite directions as shown below. A bicycle moving 1m/sec, and bicycle B 2m/sec. If the distance between the two cyclists is 9 meters, when and where the two cyclists are met?

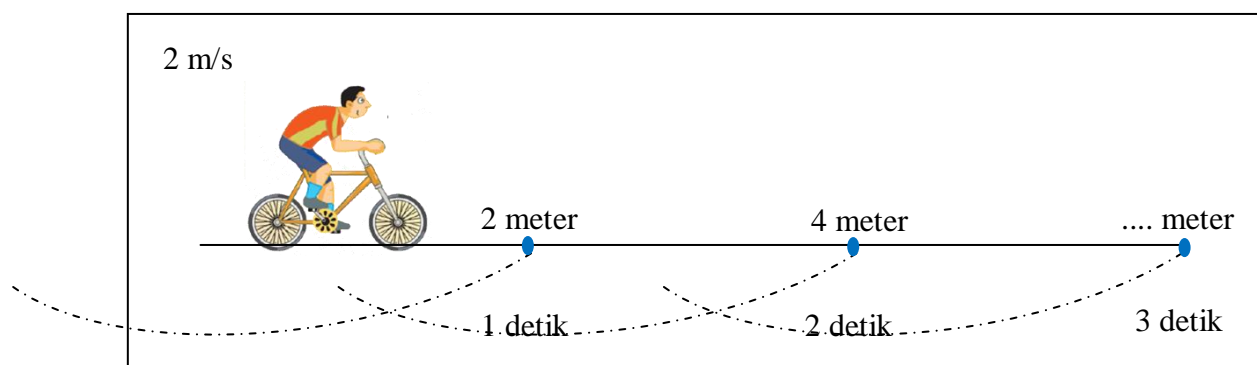


FIGURE 2. The illustration of 2 m/s

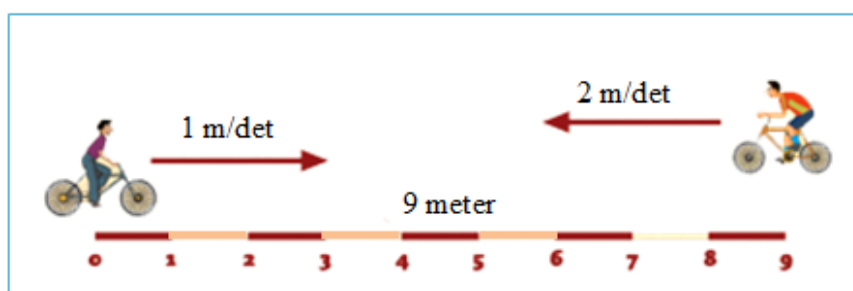


FIGURE 3. Motion of two objects with the opposite direction

From the illustration above is known that every 1 second; A bicycle moves as far as 1 meter and bike B moves as far as 2 meters

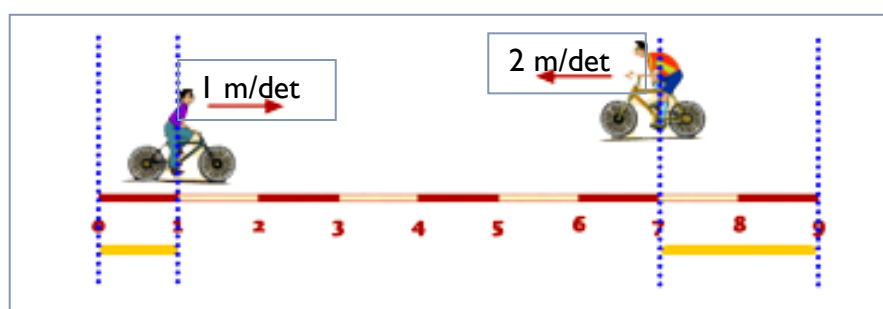
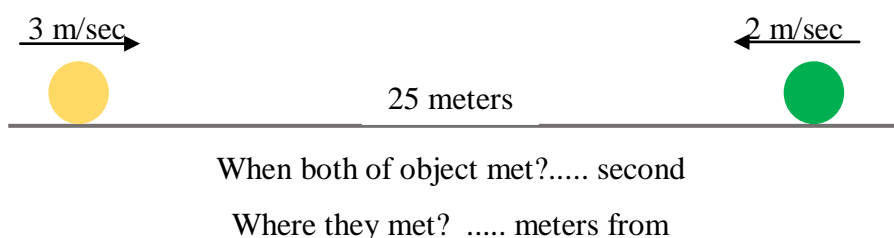
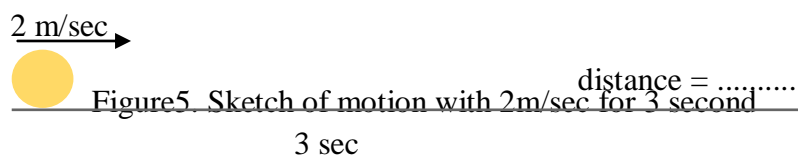


FIGURE 4. Displacement illustration each time

So, every 1 second, the two are approaching  $1 + 2 = 3$  meters. Because of the distance of 9 meters, then the time required is  $9/3 = 3$  seconds. Thus, the two cyclists met at the position from A:  $1 \text{ m/sec} \times 3 = 3 \text{ m}$

from B:  $2 \text{ m/sec} \times 3 = 6 \text{ m}$

To help students understand the physics problem above, it is necessary to sketch a moving object as follows



**FIGURE 6.** Motion sketch of two object with opposite direction with  $3\text{m/sec}$  and  $2 \text{ m/sec}$ .

The use of simple figures, illustrations physical quantities, and use sketch is a solution that can be applied in the teaching of physics, especially for students who have a mathematical problem. Therefore, the above solution is applied to the students of class X SMAN 1 Tinambung whose physics score was low category and they were not motivated to learn physics

## METHOD

This research was quantitative research with posttest only control group design. The subjects were students of class X SMAN 1 Tinambung Polewali Mandar of West Sulawesi province. Subjects chosen were students whose physics score was low and they did not like physics. Students follow a learning process taught by their own teachers who had attended training of GASING physics learning. After following the lesson, the students answered multiple-choice test of 30 questions to determine the level of their understanding of the physics of matter. The data obtained from the test results were then categorized into levels of learning outcomes physics to describe the physics student learning outcomes

## RESULTS AND DISCUSSION

Learning outcomes achieved by students after attending a physics lesson GASING measured using a multiple choice test. From the results of these tests can be concluded categories of student achievement as follows.

**TABLE 1.** Categories scores physics student learning outcomes

No	Range	frequency		Categories
		Pre test	Posttest	
1	25 – 30	0	0	Very high
2	19 – 24	0	9	High
3	13 – 18	0	0	Average
4	07 – 12	6	0	Low
5	0 – 6	3	0	Very low

The above results show that not only the students were able to answer the clever physics correctly, but the students were considered ignorant even be able to answer correctly during the learning followed poses fun for them. How GASING of learning physics can be easy and fun for students and make them initially considered stupid able to resolve the matter physics properly. One thing we need to believe, that the students obtain a lower score or even hate a subject because they have not found a good way of learning for them.

GASING physics learning was designed for students who had been in no mood to study physics. Through this learning, physics problem solved using simple logic. Physical quantities that exist with an equation illustrated so that students were able to understand the meaning of these quantities. In addition, the equations of physics simplified so that students did not need to do the substitution equation. The above description was a form of scaffolding for students to achieve the learning objectives or the zone of proximal development (ZPD). This is in line with the findings of the investigators that the students have the benefit of learning when teachers and peers using scaffolding (Santrock, 2008).

If the ZPD is a zone of potential where students can achieve it with the help of a friend who is more skilled, then the zone of current development (ZCD) is the degree to which students can achieve troubleshooting without the help of others (Wass et al., 2011). To assist teachers in preparing optimizing the ZPD, the scaffolding is used as a guide in the completion of the task. Bruner (Wass et al., 2011). On GASING physics learning, scaffolding is given in the form of drill about using sketch

The purpose of the scaffolding is to assist students in achieving the next level through a variety of approaches. According to Pritchard & Woollard (2010), a teacher can use different rules to implement such scaffolding:

1. Teacher as simple maker; break the problem into smaller ones that can be handled by students
2. Teachers as lightening; shows aspects of tasks or questions that require more attention than other aspects;

According to Clarke, Scaffolding in the form of a simple sketch will give an idea to the students about the relationship between the facts they observe the physics concepts they learn (Ong, 2006)

From the above description showed that the implementation of learning physics GASING, can improve student learning outcomes physics, and this proves that students who had been considered stupid basically got great curiosity as well as other students. If teachers ignore the students weaknesses that cause they did not like physics, the physics will be subject dreaded by students. And if this was allowed to drag on, then they will be embedded mental set that physics is difficult.

Teachers need to identify the weaknesses of students in studying physics and then decide the appropriate solution to assist them in learning. This situation can build positive relationships with students and will encourage them to engage academically in achieving better performance. Establishing positive relationships with students will involve more than just liking each other is a positive relationship which includes the development of a class atmosphere that is characterized by trust and respect (Sullo, 2009).

## CONCLUSION

Based on the data research can be concluded that 100% of students who learned physics through GASING physics learning obtain a score in the high category after taking the test.

Physics is a subject that is very interesting to study, because it has a close connection with natural phenomena in our environment. But the fact of physics is unattractive to most students because of the constraints of students in learning physics had never been treated. This paper is the solution of the main problems of students in learning physics. Through learning physics GASING, students who do not like a physics lesson even be happy with this lesson. to achieve better learning physics, then the teacher should be able to identify the weaknesses of students in learning and then find solutions to overcome these problems

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