



ILLEGAL MINING ACTIVITIES AND ITS IMPACTS ON NATURAL RESOURCES; CASE STUDY AT KADE MUNICIPAL IN THE EASTERN REGION OF GHANA.

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Abstract

This is a two part research work which focuses on illegal mining (*Galamsey*) both at the mining sites and in schools in Ghana especially second cycle institutions. Gold mining in Ghana is a big business giving the county Billions of Pounds Sterling's yearly. The sustenance of the country is based on this surface and underground resource which has boosted the economy over the years. Big mining companies have been established through standardization and undergoing mining to boost the Ghanaian economy. These mining companies like AngloGold, Perseus mines, Golden Star, Newmont etc. are using standard operating procedures (SOP's). This has been going on well over the years until man became so greedy and jealous wanting to do what these well-established mining companies are doing to help the economy. This lead to the formation of small groups called *Galamsey*. This resulted in the destruction of River Birim. The human gold mining business in the country has also deteriorated drastically as examination malpractices are practiced in the schools during final examinations. The studied WASSCE 2018 physics practical Alt A question one, which was

sampled to access the quality of examination at the Senior High level also gave a nice result but cannot be confirmed in the marking Scheme. The value obtained for the acceleration due to gravity (g) is 10ms^{-2} to the nearest whole number but this cannot be justified by what students were looking for in the general marking scheme. When the expression given by WAEC to evaluate for acceleration due to gravity, g , which ranges from 9.8ms^{-2} to 10ms^{-2} the answer obtained is 101.09ms^{-2} . This means that there should be a factor 10 to bring it to the acceptable value. This factor is the base of the logarithm used in the determining $\log T$ values to be plotted on the graph.

Keywords: illegal mining, Gold, Galamsey, SSSCE, WASSCE, gravity.

1.0 Introduction

Small scale mining activities became a boom and source of wealth for a lot of people in Ghana when standardization and controls was of no more importance in the country. Everyone



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taught he/she can embark on mining business and get something from it. After all, the land is for us Ghanaians. No rules, no standardization and corruption up there where lands are released from all angles in returns for huge sums of money. This has resulted in the destruction of water bodies all over the country especially in the southern part of the country. Water bodies that were used for drinking, cooking, swimming and fishing in the 90's are now turbid and cannot be used for anything.

Gold mining involves the digging of soils, crushing of rocks and getting unrefined gold and processing to obtain the real gold. In the same vein, taking children through the education system from primary to a level of doctorate is also mining where the individual is taken through a series of training and learning and refined into better person who can spear the affairs of the country.

The boom in small scale mining operations, popularly known as '*galamsey*', is fast becoming one of the major factors contributing to the rapid decline and destruction of forest reserves in Ghana [CSIR, 2017]. Nonetheless, the forestry sector provides direct employment to over 100,000 Ghanaians and indirect employment to over 2.5 million people (GSS, 2014). The rate of deforestation and forest degradation in Ghana has been on the rise in recent decades. From the country's original forest cover of 8.2 million hectares from the onset of the last century, only an estimated 1.6 million hectares remain. Currently, the deforestation rate is about 2.5% of the total land area of Ghana leading to an annual loss of about

135,000 ha. For example, between 1990 and 2000, the forest cover loss was about 387,256 ha (2%) whereas a total area of 531,364 ha (3%) was lost for the period 2000-2010 (FAO, 2016). In most of the regions, large tracts of forests have been encroached and degraded by both mining companies and *galamsey* operators. For instance, about 4.4%, representing 2.5 km², of the total area of the Offinso Shelterbelt Forest Reserve in the Ashanti region were degraded by illegal mining in 5 years (Boadi et al., 2016).

The illegal mining activities is not only destroying the physical natural resources of the country but also the intellectual abilities and mindset of the people of the country. Illegal mining activities within the country has resulted in a generation of people interested in money regardless of the process of getting the money. This cancer has eaten into the minds of all and entered into the education system of the country. Illegal mining activities within the country has created in a generation of academically poor students who are interested in end results (certificates) and not in the process of acquiring knowledge. The research gives a clear indication of this poor attitude towards academic (illegal mining activities) which has been in the system even during Senior Secondary Certificate Examination (SSCE) regime and now practiced by all Schools within the country in this WASSCE (West African Senior Secondary Certificate Examination) period. This illegal mining activities within the school system result in students who get good grades (A's) at the secondary school level but enters the university and are unable to compete academically. Teachers are also fuelling and spearheading such illegal mining activities



and practices within the secondary schools and at the universities. Teachers are not satisfied with the monthly earnings so it becomes a cocoa season during such periods. Controller's eagerness for money has created within the country Ghana a generation of get rich quick people who are just interested in money and not the intelligence and mindset that comes with money. They even get the money and do not know how to make good use of the money because of undeveloped money making and using mindset.

Illegal mining activities is still ongoing within the country and destroying natural resources and should be regulated with all seriousness in order to protect the natural resources (water, land and forest reserves) for the future. Ross (2001) argues that countries recognised for depending heavily on the mining sectors have higher poverty rates than non-mineral dependent countries (Baffour, 2014). This can clearly be seen as Ghana has a lot of great mining companies within the country resulting in the generation of Billions of pounds Sterling's each year but still seen as a very poor country. Most of this illegal mining activities are spearheaded by local gurus who bring white men from outside Ghana to embark on this illegalities. When the Ghanaian government decided to curb the actions of both the Chinese miners in June 2013, over 1,500 Chinese were arrested. Within a month, the Ghana Immigration Services had documented a total of 4,592 Chinese, including those arrested had departed the country (The Guardian Newspaper UK, 15 July 2013)(Baffour, 2014). But this did not result in any good results. The Nana Addo Dankwa Akuffo Addo led government decided to curtail this bad practice when voted into power in 2016. This

was yielding results at the initial stages of the campaign but has folded with the bad practice ongoing and now the need for serious attention. Galamsey activities have continued to exist in the face of government regulations against their operations. These regulations to a larger extent have not been given any stern enforcement over the years. The activities of these miners have become extensively damaging to the environment and also a disincentive to potential foreign investors in the country's large-scale mining sector (Baffour, 2014). The UNCTAD (2003) also buttress the same claim when it revealed that reliance on mineral extraction has largely been the cause of rising levels of extreme poverty in countries such as Guinea, Liberia, Niger, DR Congo, Zambia and Sierra Leone. Mining has produced minimal direct benefits for the poor compared to agriculture. The relation between mining and socio-economic development for this reason is evidently not well-defined (UNDP, 2003).

2.0 Methodology for the Work

The main method employed for this research work is solely monitoring, participant observation of illegalities within the mining sector at the field which is resulting in the destruction of natural reserves, hands on practical activities on the field. Again, participant observation in the second cycle institutions was also done to observe the irregularities within the school system. The study area for the work includes illegal gold mining sites and some secondary schools within the municipal and Ghana. Some of the illegal mining sites visited includes the Kade



Municipal, Denkyemboa district within Akwatia Constituency and Oda.

WASSCE 2018 ALT A practicals question one was taken and performed to assess the potential and strength of the questions used to access students before entry into the tertiary institutions in Ghana and other countries worldwide as seen in **Plate 1**. The main aim of the question was to evaluate for the acceleration due to gravity 'g' which ranges from 9.8ms^{-2} to 10ms^{-2} .

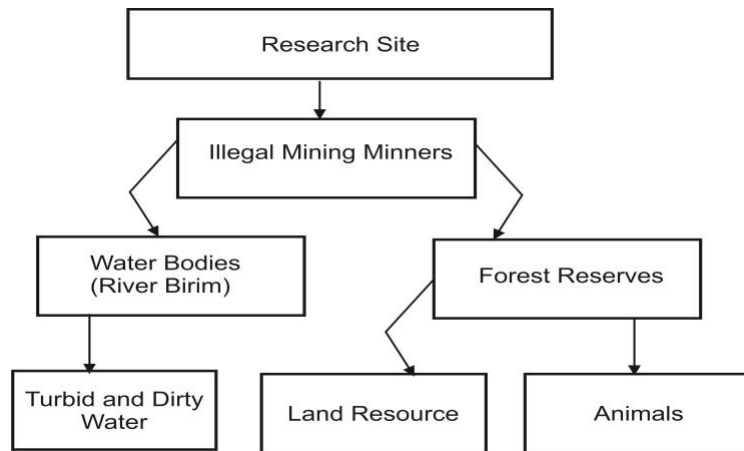


Fig 1: Activities at mining site 1 (1st Gold mining area)

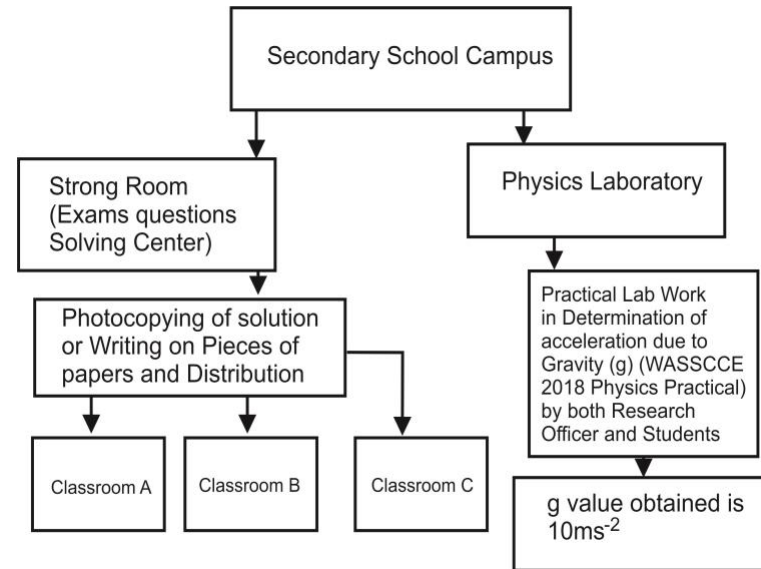
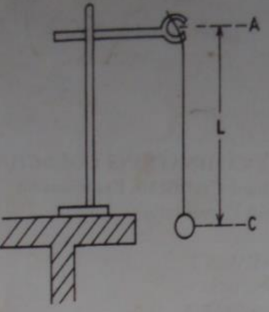


Fig 2: Activities at mining site 2(2nd Gold mining area)

(a)



You are provided with a pendulum bob, a metre rule, a stop watch, a retort stand with clamp and other necessary apparatus.

- Suspend the pendulum bob from the clamp as illustrated in the diagram.
- Adjust the pendulum such that $AC = 90$ cm.
- Displace the pendulum bob slightly, such that it oscillates in a vertical plane.
- Measure and record the time t for 20 complete oscillations.
- Evaluate T and \sqrt{L} .
- Repeat the procedure for **four** other values of $L = 80$ cm, 70 cm, 60 cm and 50 cm.
- Tabulate your results.
- Plot a graph with $\log T$ on the vertical axis and \sqrt{L} on the horizontal axis.
- Determine the slope, s , of the graph.

(x) Evaluate $g = \frac{4\pi^2}{s^2}$.

(xi) State **two** precautions taken to ensure accurate results. [21 marks]

(b)

- Determine from your graph the period of the pendulum for $L = 75$ cm. [2 marks]
- A simple pendulum bob is set into simple harmonic motion. Sketch a diagram of the set-up and indicate on it, the positions of:
 - maximum velocity;
 - maximum acceleration of the bob. [2 marks]

Plate 1: WASSCE 2018 physics practical Alt A – Question 1

In order to obtain accurate results during the research, participant observation method was the main tool so the

researcher will see the person being observed in his or her natural state resulting in valid data collection. Data collected gives a clear indication of what is happening in the system that is destroying the natural resources (both in terms of real gold and mankind).

3.0 Results and Discussion of Findings

3.1 Illegal mining and impacts on natural resources

Illegal mining activities is rampant in the southern part of Ghana with a lot of young guys engaging in it for sustenance and survival. Due to this, a lot of forest reserves are cleared day in day out in such of the fine metal. This has resulted in lands that should have been used for wildlife conservation, forest reserves and for farming. These lands are exploited and destroyed in order to get gold for sale and survival. These reserves were a beauty to admire years back but now of no use to anyone and they continue to be destroyed. The impacts of these illegalities on natural resources such as lands and forest is about 90% destruction and therefore needs drastic attention. Most of these lands and forest reserves are released by stool owners and indigenous who are eager for money. Most of them think of today and not of the future or what lies ahead.

3.2 Reason for illegal mining in communities

The main reason for illegal mining activities in Ghana is money. Everyone thinks the lands belongs to us all and if there is money in there, why not tap into it. Most of the men and woman who engage in this illegal mining (Galamsey) activities are school



dropouts who holds no certificates and therefore cannot secure a job. Another reason identified during the investigation is motive. The research established that, most are greedy and jealous of what other regions have. They therefore plan to move from their region to enter other regions having the gold reserve to destroy the lands, forest and water resources. Such people have destroyed all the resources in their communities and hence become very jealous when they see the resources of other communities, and hence nothing to do but do same. Some also have the feeling that, once they will not get the opportunity to work in big gold mining companies like Newmont, they should establish one their own way.

3.3 Illegal mining (*Galamsey*) and impacts on River Birim

Water they say is life, and therefore a fine good. Man's existence on the surface of the earth has been mainly water dependent. River Birim is the main river within the Kade Municipal which was serving thousands of people before illegal mining started within the Eastern Region of Ghana. This river was used for cooking, bathing, washing, drinking, fishing etc. This water body has been deteriorated to a larger extent and therefore of no use to the people of Kade and its environs as seen in **Plate 2**. This water can be abstracted and treated for distribution and use but at a higher cost and higher technology acquisition. This is of great concern and needs drastic action to save the resource. Many years back, surface water was a great commodity and of great importance to indigenous but now, no more. Technological advancement has taken this beautiful price tag from the surface water (River Birim) and given it

ground water. Most homes within the Municipal are using water pumped from the ground into overhead polytanks and distributed to homes for use. This has made people disregard surface water for a while now but there is the need to look in that direction. Underground water moving through aquifers have direct connection with surface water and if all surface waters are destroyed, this will have effect on underground water and therefore water scarcity in the future.



Plate 2: River Birim - KADE



Years back, people were drinking from surface water resources (like River Birim) but no more. As about 60% of Ghanaians are now drinking either bottled water or sachet water produced by pure water companies. Almost all these pure water companies are abstracting from underground for treatment and sale. Everything has an end, therefore the need to seriously look at the surface water bodies e.g. River Birim and start working on them before all aquifers get dried up with no water to be abstracted for use. If not so, the country Ghana will experience water crises in the future and will need to buy technologies used in obtaining water.

3.4 Malpractices in second cycle institutions resulting in the production of poor students / poor gold

Training of pupils from primary school to even bachelor degree level is just the same as the production of real gold at a mining company. Because the person goes through a series of processing before getting the refined metal. Education system in Ghana has deteriorated and the need for refinement as graduates produced are below standards. This is as a result of great malpractices going on within the education system right from the Junior High school to the university level. Research findings indicates that, examination malpractices has been going on for years now but became a cancer with the inception of the West African Senior Secondary Examination. The investigation established that, teachers take money from students, solve exams questions and sends them to students in the examination halls. Because students know teachers are

ready to solve questions and bring it to the examination centers, there is no desire to learn and don't even take lessons serious. The cancer has become so bad in that, students are no longer interested in knowledge but just certificates and money. One enters a class and you see in the eyes and minds of students that, let them alone, you are through with the syllabus in one day with everything being downloaded from your mind into their minds. This is a very bad behavior which need not be entertained at all. This behavior produces students who get good grades at second cycles institutions but unable to perform at the university or internationally. Even after graduation, their output and behaviors at work places is nothing to write home about. This issue needs to be addressed seriously before it destroys us as a nation.

3.5 Reasons for malpractices leading to poor gold's produced by the schools

The main factor established during the investigation for malpractice is unhealthy competition. Everyone wants his or her daughter to get to the top regardless of the process. This is what has destroyed the country Ghana with a lot of unbehaved and non intelligent people at the top, blowing horns and blasting presidents, world leaders and people here and there. The education system of Ghana needs to let people go through it perfectly and stop changing hands. If the country Ghana allows all to go through the system well, write examinations under the same condition, respect people and marked under the same condition, Ghana will be a better place.



Another factor established during the investigation is money. Most teachers are so money conscious and not satisfied with their salary hence ready to exchange their certificates for small money during examinations such as BECE, SSSCE and WASSCE.

Another factor is school fame. Every graduate loves to be associated with a famous school and that is one cancer established leading to extensive malpractices in the schools. The official examining body West African Examination Council (WAEC) does classify schools after every examination in Ghana and schools want to find themselves as top performing schools. In order to achieve this, they sort to examination malpractices during WASSCE.

For school growth and increase in intake of pupils is another factor. Some Junior high and senior high schools are private schools and their numbers depends on performance during BECE, SSSCE and WASSCE. They therefore do all they can for their students to pass in order to increase school population. If the school is unable to perform that becomes the end of the school. People hear of them and registers their children for remedial courses when the school perform and this is another cancer destroying the education system which needs to be looked at.

3.6 Effects of malpractices on students in the society

Examination malpractices has become a cancer that has eaten into the education system and producing students with no

future and hope. Education is supposed to make one better and strong, well advanced and prepared for the future to face all challenges and help make the world a better place. Education in Ghana doesn't seem so as its turning graduates into drunkards, smokers, bet stakers, examination malpractices experts and so on. Most of the graduates from WASSCE end up as school dropouts as their results are nothing to think of. One may also ask the question? How come they don't get the results after being solved by their teachers? It looks like now people want to live the life of others while each one is for himself/herself. This is the reason why the universities of the country are producing graduates who are unable to solve national issues or problems.

The malpractices issue in our second cycle institutions is making students treacherous and they take this to the tertiary institutions thinking they are doing good to themselves. They complete with high grades (1st class) and when given national issues to address, it's a big problem. The research establishes that the change of hands from O' Level to SSSCE and WASSCE wasn't well done or the controllers who took over had a bad intention of destroying the education system and have done exactly that based on the current happenings within the education sector.

3.7 Determination of acceleration due to gravity (g)

WASSCE practical 2018 Alt A was performed with students to determine the acceleration due to gravity (g). Plate 1 gives the



sampled question used. **Table 1** Below gives the experimental results.

Table 1: Experimental values obtained for 20 oscillations of a pendulum bob

l/m	t/s	$T = \frac{t}{20}/s$	$\sqrt{l/m^2}$	$\log T$
0.9	37	1.85	0.948	0.267
0.8	36	1.8	0.894	0.255
0.7	33	1.65	0.837	0.217
0.6	31	1.55	0.775	0.190
0.5	28	1.4	0.707	0.146

3.7.1 Determination of slope

$$\text{Slope, } S = \frac{\Delta \log T}{\Delta \sqrt{l}}$$

$$S = \frac{0.2 - 0.05}{0.8 - 0.56} = \frac{0.15}{0.24}$$

$$S = 0.625$$

3.7.2 Evaluation of acceleration due to gravity, g

$$g = \frac{4\pi^2}{s^2}$$

$$g = \frac{4 \times 3.142^2}{0.625^2}$$

$$g = 101.06ms^{-2}$$

Therefore the correct value of g is determined by dividing the value obtained here by 10 which is the base of the logarithm used.

$$g = \frac{101.06ms^{-2}}{10}$$

$$g = 10.106ms^{-2}$$

3.7.1 Problem associated with WASSCE 2018 Physics Practical Alt A, Question 1 and Recommendation

Expression given by WAEC to determine the acceleration due to gravity is

$$g = \frac{4\pi^2}{s^2}$$

When this expression is used to evaluate for the acceleration due to gravity which ranges from $9.8ms^{-2}$ to $10ms^{-2}$ the answer obtained is $101.09ms^{-2}$. This means that there should be a factor 10 to bring it to the acceptable value. This factor is the base of the logarithm used in the determining $\log T$ values plotted on the graph. Therefore the correct expression for the determination of 'g' WAEC should have used is



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$$g = \frac{4\pi^2}{10s^2}$$

This expression wasn't clearly spelt out in the question paper and in the marking scheme which I think is a shortfall from the

examining body (**Plate 1 & 3**). With this and the answer obtained, it gives a clear indication of irregularities surrounding the WASSCE examination which needs to be looked at



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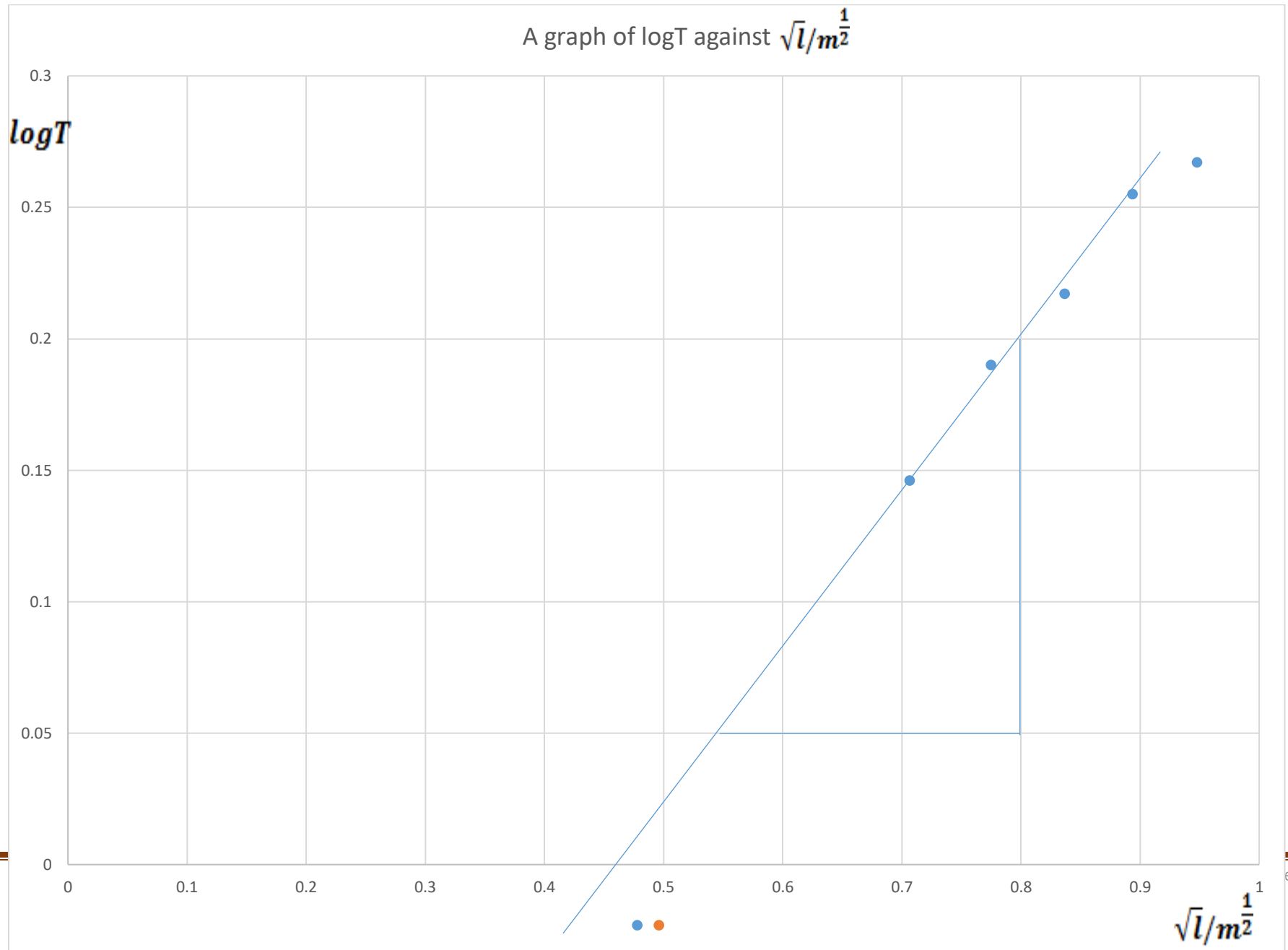


Fig1: A graph showing the plotting of $\log T$ against $\sqrt{l}/m^{\frac{1}{2}}$

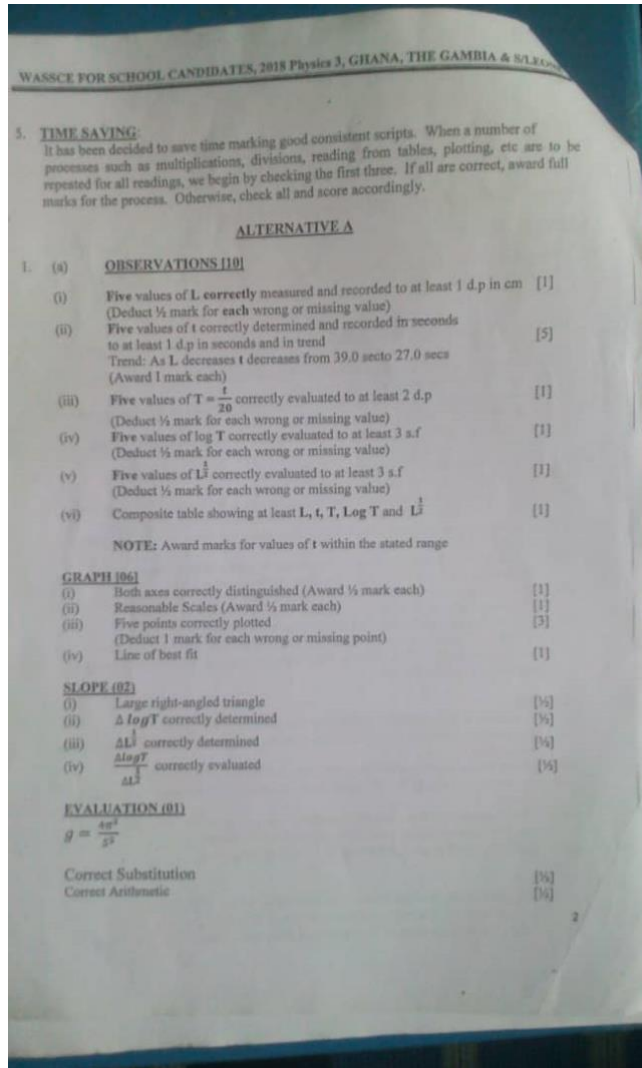


Plate 3: WASSCE 2018 Alt A Question 1 marking Scheme

4. Conclusion

Gold mining business is a powerful industry yielding Billions of pounds sterling each year for the country Ghana. Due to this, Blackman has become so anxious to mine the precious mineral by all means. This has resulted in illegal mining (*Galamsey*) in most communities within the country destroying land reserves, water bodies and vegetation. River Birim is the main river within the Municipal which was serving thousands of people yearly. Due to the illegal mining activities within the sub – region, the water body has been destroyed and now turned into mud and therefore of no importance to the people. A lot of surface water bodies have been destroyed due to this illegal mining (*Galamsey*) activities and therefore the need to be looked at seriously by authorities and government. The NPP government upon taken the leadership of the country in 2016 is fighting the cancer but still more needs to done. Most of these illegal mining activities are now done during the night when all are asleep. This makes the fighting of the cancer very difficult. The government needs to expedite action in fighting illegal mining if not, future generations will find it difficult when it comes to getting land for farming activities, water for



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cooking, washing, bathing etc. The forest vegetation's and reserves needs to be conserved if not life will extinct from the surface of the earth (as last tree dies, last man also dies).

Mining is also seen as the process of training and nurturing of students to be very responsible people of society. That is passing through the hot fires of learning from nursery to doctorate or professor level. This is been done through the education system of the country. The education system of Ghana has deteriorated as examination malpractices is on the rise within the first, second cycle and tertiary institutions within the country. Students are now eager to get rich quick hence just interested in certificates regardless of the process of acquiring. Teachers who supervise during examinations are money oriented and therefore ready to sacrifice their hard earned certificates for this young once by solving the examination questions, photocopying them or writing them on sheets of papers and sending them to the examination halls for students to copy and pass. This is a very serious cancer which needs to be uprooted from the system for the future and betterment of Ghana and WAEC – West Africa.

During the research work, WASSCE 2018 physics practical Alt A was investigated in order to establish the standard of the questions to verify the quality of student's production for the human gold production business. The studied WASSCE 2018 physics practical Alt A question one that was sampled to access the quality of examination at the Senior High level also gave a nice result but cannot be confirmed in the marking Scheme. The value obtained for the acceleration due to gravity (g) is 10ms^{-2}

to the nearest whole number but this cannot be justified by what students were looking for in the general marking scheme. When the expression given by WAEC to evaluate for the acceleration due to gravity which ranges from 9.8ms^{-2} to 10ms^{-2} was used, the answer obtained is 101.09ms^{-2} . This means that there should be a factor 10 to bring it to the acceptable value. This factor is the base of the logarithm used in the determining $\log T$ values to be plotted on the graph. The factor was missing in the formula given and this questions the ingenuity and quality of the question which has been used to access students and given A's in Physics throughout the country and to WASSCE West Africa students offering physics. This students have been given admissions into universities in Ghana and worldwide based on the A's in physics and this is a big question to answer. This I believe is a problem as the marking scheme did not show clearly how to obtain the final value of g rendering the question one void. And I believe student's assessment was also based on the question one. And therefore cannot tell the purpose of that practical question and what students were looking for.

Acknowledgement

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