CHAPTER ONE

INTRODUCTION

The chapter one of the study shall deal with the background of the study, Statement of the problem, the purpose of the study, research questions, significance of the study, Limitations, delimitations and organization of the research.

BACKGROUND OF THE STUDY

The study of science forms the basis of current discoveries and invention. The scientific and technological advancement of any nation depends on a meaningful education in science, based on discoveries and inventions.

The progress of every nation in science and technology can begin at the basic level of her educational system where scientific concept formation is laid. It is in the light of this; that the general aims of the Integrated Science Syllabus for primary 4 – 6 was designed to help pupils to :

1. develop the spirit of curiosity, creativity and critical thinking ability.
2. develop an inquiry attitude to life.
3. develop the ability to communicate scientific ideas.
4. explore and show appreciation of their environment.
5. live a healthy and quality life.

From the above stated general objectives for science teaching, it is clear that in order to develop concepts science at adopt a blend of appreciation teaching approaches

which will generate interest and understanding of pupils, thereby encouraging the pupils to take active part in science lessons.

It has also been observed that the teaching of science at the basic level does not involve pupils so much as to make science interesting subject to them. Considering the condition under which science is taught in most basic schools, it is hardly real to expect the general aims to be achieved at the end of the course.

These days, educational stakeholders have come to realize the relevance of improving the teaching of science at the basic level using common materials within the environment as a key to unlocking the knot inhabiting the teaching and learning of science.

Thomas G. (1967) supports the view that for many years basic schools science was taught incidentally as a formal subject; its experimental aspects were ignored. Even when textbooks show and describe a fairly simple experiment that teachers and pupils could perform in the average classroom, such suggested experiments are overlooked at by the teachers.

According to Gyan and Mary (1989), most teachers ignored the practical approach for the following reasons:

1. the large class size which makes it impossible for the teacher to provide adequate materials to all pupils during science lesson.
2. lack of skills and competence on the part of teachers to improvise common materials within their environment.

3. lack of predisposition of teachers to the use of activity-based approach of science teaching.

The primary Integrated Science Syllabus states that the Ghanaian basic four (4) to six (6) pupils live in an age and would be dominated by science and technology. For any advancement to be made socially or economically in the environment of the pupils, the pupils would have to undertake and appreciate the impact of science on his or her environment.

The research is however conducted at Anyinabrim at Assin South, located closely to a typical rainforest suitable for crop cultivation. The fact that the people in the town have easy access to fertile land, they are induced to engage in farming as their major occupation. Due to that, the pupils have develop interest in their parents occupation which happens mostly to be farming. This makes pupils concentrate more on farming projects regardless education, let alone the study of science which is the yard stick for economic advancement.

Some pupils often absent themselves from school without tangible reasons than to say that they do accompany their parents to farm to pluck cocoa pods.

STATEMENT OF THE PROBLEM

Generally, most basic school teachers hardly use the activity-based approach in science teaching. There is the problem of lack of practical expose to science teaching at the basic level. This makes concept development difficult to achieve.

During the researchers first four weeks of internship in basic four at Methodist School Anyinabrim, it was observed that the class teacher taught science lesson thoeritically without paying much attention to the practical aspect. After reading through pupils exercise books, it was observed that pupils did not understand some basic concepts and not so the concept development was a problem.

The researcher developed interest in this problem and hence observed the teacher whenever science was taught using the lecture-based approach. Pupils' response at the end of each lesson in science was not all that encouraging.

The result of this unfortunate situation was that pupils were not able to discover, explore and develop interest in science. The researcher therefore realized that the method used was not appreciated for teaching the subject. This motivated the researcher to investigate into the problem and to explore the activity-oriented approach for teaching Integrated Science using common materials within the environment.

PURPOSE OF THE STUDY

The purpose of the study is to :

1. encourage the teachers at Anyinabrim Methodist Basic School to use the activity-oriented approach in science teaching.
2. develop in both the teachers and the pupils the spirit of using common materials within the environment in teaching and learning process of science.
3. asses if pupils performance can be improved by using practical approach in the teaching and learning process of science.

4. asses the impact of using common materials within the environment in the teaching of science.

RESEARCH QUESTIONS

1. What activity(ies) contributed to the poor performance of Assin Anyinabrim Methodist Primary four pupils in science lesson?
2. Will the use of common materials within the environment help improve the teaching of science in Assin Anyinabrim Methodist Primary four?
3. What impact do the materials developed locally have on teaching and learning of science at Assin Anyinabrim Methodist Primary four?

SIGNIFICANCE OF THE STUDY

The study will serve as a model to the basic school teachers to be able to adopt the activity-oriented approach in the teaching of science lessons.

The study will equip the science teachers with the skills of lesson preparation and presentation.

It would show that by using improvised materials, we save money which could be spent on purchasing of the expensive and difficult to come-by apparatus.

LIMITATIONS

The researcher encountered difficulties in the course of the study. The following are some of the limitations that hindered the among the target population of the study.

First to mention was the time scheduled for the completion of the whole research work. The time allotted to the whole works completion should have spanned over a year. But for the condition under which project week is governed, the length of time is reduced. This restricted the researcher to delve more into the problem and come out with more valid information elicited from the pupils. Besides, in order to gain more facts to buttress points in the research work the researcher hard to visit well equipped internet cafes for facts. This had to be combined with classroom work.

Also, the instrument the researcher employed in data collected –observation, was not reliable because it cannot provide information about past events. The pupils might have performed better in previous lessons than they did in the lesson the researcher observed.

The last but not least is that the researcher had to spend ample time in the test administration, let alone the construction of the test. These are the weakness that came in a way of the researcher in the research work.

DELIMITATIONS

The research was to be conducted on the whole population of Assin Anyinabrim Methodist Primary School. For time constraint, the researcher restricted the research work to only one of the six Primary classes. The researcher had to choose a class from

among the various classes. It became rational on the part of the researcher to select a substantial class to which the researcher was assigned to Basic four.

Moreover, the nature of teaching and learning Materials (TLM) available compelled the researcher to limit the research work to the class stated above. If the researcher involved the other classes, inadequate TLMs would have made it cumbersome at the intervention stage.

ORGANISATION OF THE STUDY

The research work covers five chapters of different issues discussed under the topic "Improving the performance of Assin Anyinabrim Methodist Primary four pupils in science practical lesson using activity-oriented approach."

The chapter one gives the introduction, background to the study, statement of the problem, purpose of the study, limitation, and delimitation of the study.

The chapter two reviews the work done by other writers on issues that relate to the use of activity-oriented approach in teaching Integrated Science. The researcher laid emphasis on the primary school science education;

1. what is science ?
2. the teaching and learning of science.
3. what is activity-oriented approach?
4. improvisation of teaching and learning materials and the summary of facts.

The chapter three talks about the research methodology which covers activity of the study, Sample and Sample procedure, the instrument used (observation) and how the instrument was used.

The fourth chapter shall deal with data analysis and discussion of the study and findings.

The fifth chapter deals with summary, conclusion and recommendation of the study.

CHAPTER TWO

LITERATURE REVIEW

INTRODUCTION

In this chapter, the researcher deems it necessary to summarize and review writings of recognized authorities and previous research work done on the problem under investigation. It includes some definitions and explanations of the concept of science, strategies for teaching and learning of science, the mode of improving pupils' performance through activity-oriented approach and importance of using improvised materials.

Since science covers many disciplines, the views were selected from a number of disciplines which regard activity-oriented approach as a means of achieving the goals of teaching and learning of science.

CONCEPT OF SCIENCE

Science is the systematic study of nature in order to acquire knowledge through inquiry, observation, experimentation and evaluation of the information gained in relation with other established bodies of knowledge. Science is also a way of gaining knowledge and understanding of our natural environment.

In understanding our natural world depends on the wish to know how or why certain things occur. Such wish to know how or why certain things occur is the driving force behind all scientific inquiry (ies). Science covers a broad field of knowledge that deals with an observed facts and the relationship among these facts.

Longley (1960) defines science as a "knowledge generating activity." She views science as an intellectual activity through which regularities and explanations are sought within the environment.

However, Saunder (1965) points out that "Science is not only knowledge about the universe; it's a way of obtaining knowledge. He contends that science facts can no longer be treated as a self –existing galvanism." The idea expressed in these definitions points out that:

1. science is the direct experience with the natural environment.
2. science is a way of finding out things.
3. science is a body of facts.

Science produces new knowledge. Such knowledge produced is used to solve problems encountered in mans environment. These days, the world needs people who can inquire into problems and make inventions. It is of this view that there is the need for the basic school Integrated Science teachers to adopt the activity-based approach in

teaching science along side the use of common materials within the environment at the basic inquiry skills.

STRATEGIES FOR TEACHING AND LEARNING OF SCIENCE

The teaching of science as a subject in our basic school comprises many subjects which are set apart from others. The content of science as we sometimes think of is primarily a record of mans accomplishment. Its major values lies in the use that we can make of to improve mans thought and actions in the future. Science will not produce its full impact on pupils life until it permeate thought and action. This could be accomplished when the child is involved in series of activities in the teaching and learning process.

The use of activity-based approach in teaching basic school science helps the child in the following ways:

1. children learn through first hand experiences. This means as children learn though activity, they develop concept so easily.
2. the approach demystifies science; creates in pupils the love for and develop interest in science at that early stage.
3. facts and concept discovered and skills developed are retained and memorized so easily.
4. The method makes children participate in the teaching-learning process but not spectators.
5. The approach makes learning of science pleasurable and removes boredom on the part of pupils.

6. The activity-based approach encourages co-operation amongst pupils or learners.
7. It also promotes self confidence in pupils.
8. It also allows pupils or learners by doing and to find out things themselves.

Edward Magoreis (1971) points out that the current trends in science education emphasizes:

1. The inductive development of concepts and principles through discovery or problems solving approach.
2. A movement towards a more pupil-teacher planned experiments.
3. the activity-oriented approach, the mode through which the child is helped to use the manipulative skills to learn and understand concepts better.

According to Jerolimet, John, Foster D. and Clifford (1976), good science programmes are heavily learner involving. This means that children must see a link between themselves and the science they are studying. Science programmes need to be b activity-based with enough time allocated for hand-on-direct experiences where children will be making use of common materials within their environment.

Science concepts and principles can be achieved through experiment. Therefore, the use of activity-based approach in teaching and learning process of science will help the child not only in science but in all other fields of human endeavour.

ACTIVITY-ORIENTED APPROACH

Activity-oriented approach is a method of teaching whereby a child, placed at the center of teaching and learning process, is given materials to manipulate in order to aid

him comes out with his own findings and generalizations. Pupils love doing things themselves which makes them understand and gain scientific concepts so easily.

Therefore, pupils need to be given the opportunity to manipulate things. This helps them to develop the spirit of coming up with new ideas and stand a chance of using these ideas for development. This is the more reason why the basic school integrated science teachers should use common materials within the environment in teaching-learning process of science to enable pupils learn and understand better, faster, creates opportunity for greater initiative, imagination and drive.

It is in the view if this that Farrant (1994) states that learning cannot be developed without active participation by the learner. Learning is by doing and so full provision needs to be made in the school for activities that promote learning.

Activities contribute to learning through complex interactions. Through activities, experiences are more readily acquired; skills are more quickly learned and new learning is better understood. To Farrant, for teaching and to be effective, activity must be purposeful and not crimeless. The need for activities in learning never ceases. So, good integrated science teacher must always use activities as a means to promote effective teaching and learning of science.

Lawton (1981) also states that a child is born into the world knowing nothing but gradually learns through activity. Lawton added that pupils learn better and faster when they are taught their own activities.

Young B.L (1979), propounded a theory which states that “I hear, I forget; I do, I understand, I see, I remember.” He was of the view of doing; which helps the child to

understand. It is very good that pupils do activities during science lessons to help them understand and also remember anytime the pupils see such activity.

However, the use of activities in science teaching helps in many ways:

It facilitates learning of science by pupils. It is of this view that, Wollman and Lawson (1978) agree that manipulating physical objects during science lessons helps to increase the pupils' development.

Dorothy, Martin and Robert (1980) are also of the view that pupils tends to understand science better when they are involved in activity during science lessons.

Edgar and Robert (1979) support the view that the result of a experiment performed by the pupils is always firmly understood and memorized than something which is merely demonstrated to the pupils or read about.

It helps the pupils to develop the skills of experimenting, observation, communication, counting, classifying, making hypothesis etc (B. L Young). This is supported by Gyan (1992) when he stated that "the effective way of teaching science to promote effective learning and acquisition of skills is through activity method."

To Piaget, knowledge develops as a result of interaction with the environment. The learners acquire knowledge about objects and event in the environment through activity.

Bernard spodek (1968) supports this view when he states that; "children needs little excitement to learn" (page 218) where the mode of learning provided for the pupils are consistent with the pupils own wishes needs for exploration and the pupils needs for

movement; where the activities that are designed by the teachers for pupils are tailored to pupils behavioural patterns and developmental needs.

Karplus (1977) is also of the view that the activity oriented approach to science teaching helps pupils to develop inquiry spirit, independent thinking and manipulative skills of the pupils. It is apparent from this that science in the basic school is not merely the job of teaching a pupil the subject matter for passive acceptance. In addition to understanding, science must involve planning, doing, co-operating and intelligently operating with the natural forces in the community and experimenting with common materials.

IMPORTANCE OF IMPROVISED MATERIALS

These are materials that are used in the absence of the real objects or apparatus to bring about the same learning effect that the real or complicated materials would have brought. The materials can be invented or arranged out of what is conveniently available within the environment.

Jocobson and Willab J. (1970) says since a critical characteristic of a good basic school science programme is that the children have a chance to experiment and carry out investigation, since equipment are essential; they are needed by a teachers to demonstrate and undertake a co-operative investigation since science equipment can be improvised from inexpensive materials available locally; example, basement, shops, garages etc are often rich resources of materials found in the environment.

A very vital opportunity of using improvised materials for experiment is that children participate fully in the actual construction of the apparatus and that gives them some idea of how such apparatus works.

By using improvised materials in teaching at the basic level of Ghana's education; it brings home and make clear an unfamiliar concepts and principles of science to pupils.

It also helps to fully engage pupils in all practical science lessons.

Concerning over loss, breakages and repairs are minimized because materials were made locally using materials commonly found in the environment. It helps in acquisition of appropriate manipulative skills as improvised materials are hardy and handy and can be readily replaced or repaired when damaged.

However, the basic science syllabus requires the teacher to provide enough materials in teaching science to enable the pupils learn using all their senses, since pupils have different needs and may learn at different rates, improvising materials to teach them could enable the teacher to provide balanced activities to satisfy each child's peculiar needs. Also, where schools are isolated or inaccessible, materials can be improvised to enhance science teaching and learning. It is also, clear that when science teachers improvise materials, development of their potentials occur. At the basic school level, emphasis should be placed on the process rather than the product of science. At this level, the child does not expect detailed explanations. To assist a pupil with this kind of training, there is the need to engage the pupils in practical learning activities

and help them to collect, arrange, classify and make their own observation and explain what they have observed.

Beauchamp (1963) maintains that that the scientist can repeat the experiment as often as the pupils wish so that they can obtain the information they need. Therefore, the use of common materials within the environment will help the basic school integrated science teacher to improvise and use activity-based approaches in the teaching and learning of science.

SUMMARY OF FACTS

In summary, one can attest that all the writers are in favour of the use of common materials within their environment and the use of activity-oriented approach in the teaching-learning process of science, as they see it as the best. It is clear that the method removes boredom and assessment of pupils by the teachers becomes easier.

Also, the various presentations asses that the chance of assisting a pupil cognitive and intellectual development is that the pupils should be given an opportunity to use the available local materials to come out with their own observation.

The writers also agree that active involvement of the pupils in the teaching and learning process helps to focus children's attention on the task ahead, promote efficiency in learning, alerts the children to their inputs in the teaching-learning process of science. It provides a dramatic source of feedback, also helps pupils to be innovative and to be co-operative in the classroom situations.

CHAPTER THREE

INTRODUCTION

This chapter presents the methods used to obtain data for the study. The chapter has been arranged in the following order;

i. Research design

ii. Sample

iii. Research Instrument

iv. Data collection procedure

v. Intervention processes

RESEARCH DESIGN

The study looks at the way to use activity oriented approach to enhance the performance of Basic Four Pupils of Assin Anyinabrim Methodist Primary School. The research design is an action which the research works collaboratively with other people to solve perceived problem. In School situation, the research is desgned to encourage teachers to be aware of their own practice to be critical of that practice and to be prepared to change.

The researcher used action research design because it allows the researcher and the pupils to learn experientially about the research process by being there and by doing it instead of being to how to do it. The design also focuses on specific problem located in an immediate situation and finding solution to such problem in order to bring about a change for example problem identified in classroom learning situation.

Action research design has its attached strengths and weaknesses; some of the strength in this study includes the following. It helps the teacher to understand what actually goes on in teaching and learning situation. Thus, as stated earlier, action research allows the teacher to earn experientially about the research process by being there and doing it instead of being told how to do it.

Also, action research design also provides the researcher with the opportunity of acquiring a better understanding of all aspects of their practice be it in relation to the subject, content, the curriculum or the method appropriate to the level of the pupils in

the perplexing problem the research tries to examine the method employed in teaching science practical lessons.

To elaborate on the weaknesses, the action research design has few respondents and therefore it is difficult to curb completely an existing problem. This is because when you take a problem like pupils poor performance in science lessons. The intervention of the researcher will only be administered on the sample from the population, therefore, the rest of the pupils in other class with similar problem will not have the opportunity of going through the intervention procedure, there resting on their usual performance.

Furthermore, the time for the action research design is so limited. It is limited to the extent that it permits the researcher to make a theoretical made study on an identifiable problem. This is seen in some causes where activities are left unattended to but rather perusing things that would have happened if the activities had been carried out so one can conclude that due to time constraints, the action research design can give the research the guarantee to undertake descriptive work rather than practical application of the intervention.

POPULATION AND SAMPLE SELECTION

Assin Anyinabrim Methodist Primary is a school in the Assin South District in the central region. The school has a heterogeneous population totaling about 350 pupils. The entire population of the school is made up of the pupils from Assin Anyinabrim Township, Amanbetse and Akrofoum. The pupils from Anyinabrim form the majority

of the pupils' population. There are two pupils' schools established by the two missionaries namely Methodist and Catholic school. The research is therefore conducted at the Methodist Primary School where the researcher provided his services.

The target population consists of pupils, headteacher and teachers of Assin Anyinabrim Methodist Basic School. Much attention was focused on pupils after which information was elicited from teachers and headteachers to buttress or added up to whatever was gathered from pupils. The essence of this structure was to collect detailed and objective information as much as possible from different groups of people responsible for pupils' educational performance.

The accessible population was basic four pupils which consists 30 pupils. In addition, four teachers were randomly selected. The names of all the teachers including the mentor were written on pieces of papers which were folded and put in a box. The box was shaken for some seconds after whom five of the papers were picked. The headteacher and teacher were interview.

RESEARCH INSTRUMENT

The instrument used for the study was observation, interview and test. The researcher observed the teacher whenever science lessons were taught. This enabled the researcher to find out the type of methods the teacher employed in the teaching of science lessons. Since the other instruments were not applicable in finding out the methods used by the teacher, the researcher deemed it necessary to use observation.

Again, Test was also used by the researcher to find out the extent to which the pupils understood science concepts based on the methods the science teacher uses. The researcher chose test because it was only instrument to measure the performance of pupils with regards to concepts development. It also diagnoses the difficulty level of the pupil and would provide the researcher the evaluation of the technique used for the study. A teacher made test was used to collect data for the pre-test. This was used to diagnose the extent of the problem and also to determine the effectiveness of the intervention that has been designed to address the problem under investigation.

The researcher also used interview to find more about the problem in hand. The headteacher was interviewed by the researcher to give his general perception about the problem. Interview was the only instrument which became applicable.

DATA COLLECTION PROCEDURE

OBSERVATION: The researcher used the first one week in the school for observing pupils in order to get first hand information as to how the concepts of science were understood by pupils. It was also to find out the methods integrated science teachers use in science teaching at the school.

Pre-test test was then administered for the class. The test consisted of ten(10) test items which required the pupils to supply the correct answers based on the concept "Physical properties of air and how heat energy travels". Any correct answer a pupil wrote was awarded one week (see appendix A), giving a total of ten (10) marks. To obtain appropriate responses, the researcher read the instructions as well as the test

second week of the internship and lasted for thirty-five (35) minutes. The test was taken under strict examination conditions.

INTERVENTION

The primary aim of intervention was to investigate the impact of using the activity-oriented approach as against the use of the lecture method in science teaching. Four weeks were used for intervention.

INTERVENTIONAL PLAN

WEEK THREE

SCHOOL: Anyinabrim Methodist Basic School

CLASS: Basic Four

TOPIC: Air pressure

OBJECTIVE: By the end of the lesson, a pupil will be able to explain that air pressure works in all directions.

INSTRUCTIONAL MATERIALS: Plastic covers, drinking glass, wooden cover and water.

ACTIVITY I

The researcher grouped a class of thirty pupils into five and distributed to each group plastic cover, drinking glass, wooden cover and water.

ACTIVITY II

The research asked each group to fill the drinking glass with water. The researcher then asked pupils to press the plastic cover over the top of the glass.

ACTIVITY III

The researcher asked each group to turn the glass of water upside down and observe what happens. Pupils were also made to cover the glass with the wooden cover and turn the glass upside down and also observe what happens.

ACTIVITY IV

The researcher asked the following questions after the activity:

i. What happened when you tipped the glass in all direction?

ii. What happened when you used the wooden cover?

DISCUSSION: The discussion with the pupils showed that the plastic cover did not fall. The reason was that the content of the glass exerted less pressure than the air outside it. Again, tipping the glass in all direction demonstrated that the pressure is exerted in all planes. The plastic cover was released to be superior to that of the wooden cover because the former does not soak up water.

ASSIGNMENT: Pupils were to perform similar activity at home using different covers and report on their findings during the next lesson.

WEEK FOUR

TOPIC: By the end of the lesson, a pupil will be able to demonstrate that air has weight.

INSTRUCTIONAL MATERIALS: ten matched balloons, five meter rule, strings and five tape measures.

ACTIVITY I

The researcher asked pupils to be in their respective groups. The researcher distributed to each group, two matched balloons, a meter rule, a string and a tape measure.

ACTIVITY II

The researcher guided pupils to hang a meter rule evenly using a string and a tape measure. Each group was asked to attach the string loosely to each of the two balloons.

ACTIVITY III

Each group was made to tie the string to either end of each of the rule. Note: Be sure the rule is balanced after the balloons are hanged.

ACTIVITY IV

The researcher posed the following questions to ascertain whether the pupils closely followed the experiment:

i. What will happen if you blow one balloon and rehanging it?

ii. In what ways will you make the rule balance again? Note that the string must stay at the end of the rule.

DISCUSSION: The discussion with pupils proved that air has weight because when one of the balloons was inflated, the rule lost its balance. Again the balance was restored when the other balloon was deflated.

ASSIGNMENT: Draw the set-up of the experiment and label it.

WEEK FIVE

TOPIC: Heat Energy – Conduction

OBJECTIVE: By the end of the lesson, a pupil will be able to describe how heat travels in solids.

INSTRUCTIONAL MATERIALS: Candles, shea butter, matches and copper metal rod

ACTIVITY I

Pupils were put into their respective groups and the researcher distributed to each group a candle, a box of matches, a piece of shea butter and a copper metal rod.

ACTIVITY II

The researcher took copper metal rod which is 30cm long and made marks on it at the distances from one end: 10cm, 15cm, 20cm and 25cm respectively and urged each group to also to do the same to their respective copper rod.

ACTIVITY III

Pupils were asked to place bit of shea butter at the four marked points and one end of the rod.

ACTIVITY IV

A pupil from each group was asked to light a candle and heat the other end of the rod with it.

OBSERVATION: Pupils observed that the shea butter melts as heat travels along the rod.

DISCUSSION: Discussion with pupils showed that heat traveled along the metal rod when the heat reached the shea butter, it melted from the solid state to the liquid state. After some time, pupils felt that heat was reaching their fingers. It was conducted with

the pupils that a type of heat travels in solid is what we called a conduction, under heat energy.

CLASS EXERCISE ONE (see appendix B)

WEEK SIX

TIOPIC: Heat Energy-Radiation

OBJECTIVE: By the end of the lesson, a pupil will be able to describe how heat travels in an empty space or in a vacuum.

INSTRUCTIONAL MATERIALS: Matches or lighter, candles, charcoal and coalpot.

ACTIVITY I

The researcher put pupils into groups of five and distributed matches, candle to each group. The researcher put charcoal into the coalpot.

ACTIVITY II

Pupils together with the researcher lighted the candle and the charcoal in the coalpot respectively.

ACTIVITY III

The researcher called pupils to come closer to the coalpot, observe and comment later. Pupils were asked to put their hands about ten centimeters (10cm) away from the candle.

ACTIVITY IV

The researcher asked pupils the following questions after the experiment:

i. What did you feel when you stood near the coalpot with fire?

ii. What did you feel when your hands were nearer to the lighted candle?

DISCUSSION: It was deduced from discussion that heat energy could move through air or an empty space by radiation. To radiate means to move out in all directions. In radiation heat moves outwards from a source in all directions.

The air does not need to move for radiation to occur because most of the spaces between the sun and the earth contains no air. Heat from the sun travels to us through empty space.

CLASS EXERCISE (see appendix C)

POST-TEST

The post-test was administered three days after the necessary interventions had been put in place. The essence of this post-test was to determine if the interventional strategies used were effective. It was also to establish the fact that pupils learn better when they perform the activity themselves under the supervision of the teacher. The test which was administered during the post-test was the same test used for the post-test. The time allotted for the pre-test and post-test were the same. The researcher was the invigilator himself.

DATA ANALYSIS PLAN

The data collected on the pre-test and post-test for the class would be analyzed statistically using frequency distribution table. There would also be a computation of deviation, mean and mean deviation for both the ore-test and the post-test.

The interpretation for the analysis would also be statistically shown at chapter four of the study.

CHAPTER FOUR

INTRODUCTION

The chapter four of the research work presents the data collected from the pupils scores obtained by pupils in pre-test and post-test administered to them. This immediately followed by an analysis and interpretation of the results.

The chapter therefore has been arranged in the following order:

- Frequency distribution table for the pre-test scores.
- Data interpretation for the pre-test scores.
- Frequency distribution table for the post-test scores.
- Data interpretation for the post-test scores.
- Computation for deviation, mean and mean deviation for pre-test and post-test scores.
- Interpretation of the computations.
- Table for mean scores of pre-test and post-test.
- Interpretation for the mean scores of the pre-test and post-test.

Table 1. FREQUENCY DISTRIBUTION TABLE FOR PRE-TEST SCORES.

The table below shows the scores for pre-test that was conducted during the internship period.

Marks (X_1)	Frequency (F)	Percentage (%)
0	9	30.00
1	10	33.33
2	2	6.64
3	5	16.67
4	3	10.00
5	1	3.33
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
	$\sum F = 30$	Total = 100

DATA INTERPRETATION FOR THE PRE-TEST SCORES

It is seen clearly from the above table that out of a total number of thirty (30) pupils representing the sample for the study, only one pupil representing 3.33% scored the average mark of five(5) marks out of the total of ten(10) in the pre-test. Three pupils representing 10% scored four (4) marks; five pupils representing 16.67% scored three

(3) marks; two pupils representing 6.67% scored two (2) marks. Also ten pupils representing 33.33% scored one (1) mark of the test marked out of ten.

Finally, nine pupils representing 30% scored zero (0) mark. This could therefore be seen that more than 86.64% of the class scored marks below average mark of five (5).

Table 2. FREQUENCY DISTRIBUTION TABLE FOR THE POST-TEST

The table below shows the scores for the post-test that was administered after the interventional activities.

Marks (X_2)	Frequency (F)	Percentage (%)
0	-	-
1	-	-
2	-	-
3	-	-
4	5	16.67
5	10	33.33
6	7	23.33
7	3	10.00
8	4	13.33
9	1	3.33
10	-	-
	$\sum F = 30$	Total = 100

DATA INTERPRETATION FOR THE POST-TEST SCORES

The post-test which was administered three days after the interventional activities shows that out of total of thirty (30), only five pupils representing 16.67% scored marks below the pass mark of five (5). The breakdowns are as follows:

Five pupils scored four (4) marks representing 16.67% and a total of twenty-five pupils representing 83.33% of the scored five and above out of the total of ten(10) marks.

The highest scored nine (9) marks and it was only one pupil representing 3.33% of the class.

The modal score was five (5) marks. It is therefore seen clearly that the pupils were able to perform better by scoring higher marks as compared to the pre-test after the necessary interventional activities being put in place.

Table 3. COMPUTATION OF DEVIATION, MEAN AND MEAN DEVIATION FOR

PRE-TEST AND POST-TEST.

The table below provides values for the computation of deviation, mean and mean deviation for the pre-test and post-test.

SR. Number	Pre-test(X_1)	Post-test(X_2)	D = ($X_2 - X_1$)
1	1	4	3
2	1	5	4
3	0	5	5
4	3	6	3
5	1	8	7
6	0	4	4
7	3	5	2
8	4	6	2
9	0	5	5
10	0	5	5
11	0	4	4

12	2	7	5
13	1	6	5
14	1	6	5
15	1	5	4
16	1	4	3
17	3	8	5
18	0	5	5
19	4	8	4
20	5	9	4
21	2	6	4
22	3	5	2
23	1	4	3
24	0	6	6
25	0	5	5
26	0	5	5
27	1	7	6
28	3	7	4
29	4	8	4
30	1	6	5
N = 30	$\sum X_1 = 43$	$\sum X_2 = 174$	D = 128

DESCRIPTION OF VARIABLES

N = number of pupils

X_1 = pre-test scores

X_2 = post-test scores

$\bar{X}_1$ = mean of pre-test

$\bar{X}_2$ = mean of post-test

D = difference between individual pre-test and post-test.

$\bar{D}$ = mean difference (deviation) between pre-test and post-test scores.

MEAN OF PRE-TEST AND POST-TEST SCORES

MEAN FOR PRE-TEST SCORES ($\bar{X}1$)

$$\bar{X}1 = \frac{\sum X1}{N}$$ Where $\sum X1 = 43$, $N = 30$ and $\bar{X}1$ =?

$$\bar{X}1 = \frac{43}{30}$$

$$\bar{X}1 = 1.43$$

MEAN FOR POST-TEST SCORES (x2)

$$\bar{X}2 = \frac{\sum X2}{N}$$

$$\bar{X}2 = \frac{174}{30}$$

$$\bar{X}2 = 5.8$$

MEAN DEVIATION ($\bar{D}$)

$$\bar{D} = \frac{\sum X2 - \sum X1}{N}$$ Where $\sum X2 = 174$, $\sum X1 = 43$, $N = 30$ and $\bar{D} = ?$

$$\bar{D} = \frac{174 - 43}{30}$$

$$\bar{D} = \frac{131}{30}$$

$$\bar{D} = 4.37$$

INTERPRETATION OF THE COMPUTATIONS FOR PRE-TEST AND POST-TEST (Deviation, Mean and Mean Deviation)

It could be observed from the pre-test and the post-test scores of the three (3) that almost all the pupils performed comparatively better in the post-test than in the pre-test. This shows that there was improvement in the level of performance of pupils in the post-test due to the use of activity-oriented approach to science teaching alongside discussion and demonstration in practical lessons during the interventional periods.

Also, there was a practically significance change in the learning behaviour of pupils as a result of the use of activity method in teaching science. This is because pupils' activity participated during the interventional lessons.

TABLE FOR MEAN SCORES OF THE PRE-TEST AND POST-TEST

Below is a table showing the mean scores of the pre-test and post-test.

TEST	MEAN
Pre-test	1.43
Post-test	5.8

INTERPRETATION FOR THE MEAN SCORES OF BOTH THE PRE-TEST AND POST-TEST

From the table, it has been indicated that the mean score for the pre-test was 1.43 and that of the post-test was 5.8. This shows a difference of 4.27 depicting that three has been a great improvement in the performance of the pupils after the interventional activities had been conducted.

This points out that when teachers organize their teaching strategies well by using the activity-based approach alongside the use of common materials in the environment, combination of discussion and demonstration methods effectively, pupils will learn better and their interest in science lesson would be generated and sustained.

CHAPTER FIVE

INTRODUCTION

This chapter presents the summary of the research findings, conclusions, suggestions and recommendations based on the findings. This chapter forms the concluding part of the study conducted at Assin Anyinabrim Methodist Basic School, Assin Aouth district in the Central Region.

The study was intended to enc ourage the use of activity-oriented approach in teaching to improve the performance of pupils as against the use of lecture method. It is the hope of the researcher that the findings would go a long way to help policy makers, other stakeholders and Ghana education Service to find out lasting solutions to the pupils perplexing problems as identified by the researcher in the teaching and learning process of science with regards to performance.

CONCLUSION

Science taught using common materials within the environment renders the lesson interesting as pupils come into contact with some of the materials found in their homes. The use of the activity-oriented approach in the teaching of science at the basic school level will help remove the fears pupils have for science and as a key to unlocking the knots inhabiting the teaching and learning of science.

The splendid improvement in the performance of pupils in the post-test was due to the intervention activities the researcher undertook, involving the pupils in the collection of materials and their direct hand-on-activities. The major problemn confronting the use of activity-oriented approach has been lack of instructional materials. Now that the awareness has been drawn concerning the use of activity-oriented approach and the availability of materials within the environment for science teaching , there will be a tremendous improvement in the teaching and learning of science at the basic school level.

SUMMARY

Pupils have been taught science lessons theoretically and that they do not consider science as part of their everyday life, hence pupils view science as abstract. The intention of the researcher was to improve the teaching and learning of science at the basic level making use of common materials within the environment.

Pre-test and post-test designed were used for the research. The thirty (30) pupils in the class were taught using activity-oriented approach alongside discussions and

demonstrations with the use of common materials within the environment. The teaching learning materials were used after the pre-test for an intervention.

The instruments used involve observation, test and interview. The test was used to assess pupils performance in science after the class teacher had taught the pupils without much practical activities. At the intervention level the researcher used the activity-oriented approach to teach the same topics "Properties of air and heat energy."The method gave both the teacher and the pupils the opportunity to collect materials within the environment; assembled, observed, described and drew conclusions.

After the intervention, the post-test was also conducted and the scores were compared with the pre-test scores. The result showed that pupils' performance improved after the intervention. This implies that when teaching learning materials are employed in science teaching with the use of activity-oriented approach, pupils do better than when materials are not being used at all.

RECOMMNEDATIONS

In the light of findings of this study, the following recommendations are made.

1. Teachers in the basic school should always design their lessons based on the activity-oriented approach of teaching. A variety of activities should always be provided for pupils to make the lesson lively and interesting. This arouses and sustains the interest of pupils throughout the lesson, leading to effective learning and concept development.

2. Teachers should be given in-service training on the practical methods of teaching science. The training should include improvisation of Teaching and Learning Materials (TLM).
3. Teachers and pupils should try to collect teaching and learning materials from basements, shops, garages and garbages dumps for science lessons.
4. Teachers should be given training at the teachers' resource centres in the preparation of improvised teaching and learning materials especially the pupil teachers using common materials within the environment.
5. Teachers should study the syllabus to know the activities suggesting for the topics in the textbooks and make the necessary preparation of getting the materials in advance for the lesson.
6. The government should provide a varieties of teaching and learning materials for teaching and learning of science in all basic school. Besides, necessary training must be given to teachers on the use of the materials provided by the government.
7. The government should give more support to primary Education Department of University of Education (Winneba) and Institute of Education (Cape Coast) so that more qualified teachers would be produced to teach science effectively.
8. The Ghana education Service should make sure that pupil teachers employed under the youth employment scheme are give training on improvisation of teaching and learning materials so as to make good use of the environment.

9. The headteachers of basic schools should be ready to release funds to purchase the necessary materials for the teaching of science when the need arises.
10. In cases where the government has not provide the needed teaching and learning materials, the headteacher liaise with the school management committee and the Parent Teacher Association (PTA) to mobilize funds to procure relevant teaching and learning materials for science teaching.
11. The government should kindly adjust the capitation grant higher a bit and also release it on time to enable headteachers to acquire science supplementary books, apparatus and chemicals for teaching science at the basic level.
12. There should be a policy that every lesson delivery in the primary school must have an activity designed for the pupils to perform.
13. Science textbooks should be made available to pupils. This will give them an opportunity to practice at home on the experiment showed in the textbooks.
14. The last but not least is that more periods should be allotted for the methodology of teaching integrated science in Ghanaian Colleges of Education so that teachers would get enough exposure to lesson to lesson plan and presentation.

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APPENDIX A

PRE-TEST AND POST-TEST ITEMS

TIME : 30 minutes

INSTRUCTION: attempt all questions.

1. The instrument used to inflate balloon or football is called

   (a) spoon (b) air pressure (c) inflator

2. The air in the inflated balloon makes it hard. This air that makes the balloon expand is known as ……..

   (a) air macho (b) air correspondence (c) air pressure

3. Heat energy travels by three ways called convection, conduction and ……

   (a) space (b) insulation (c) radiation

4. Heat from the candle reaches us by……

   (a) radiation (b) conduction (c) convection

5. The movement of heat along a solid object is known as ……..

   (a) heat movement (b) conduction (c) radiation

6. A balloon or football is always filled with …….

   (a) water (b) space (c) air

7. Air occupies …… (a) water (b) space (c) moon

8. In the experiment where heat energy travels a long copper metal rod, shea butter changes from a …….. state to a liqiud state. (a) solid (b) liquid (c) gas

9. Air has …… (a) space (b) weight (c) matter

10. When two objects are rubbed together,it causes ……..; which produces heat energy. (a) conduction (b) radiation (c) friction

APPENDIX B

TIME: 20 minutes

INSTRUCTION: answer all the question below

1. Name three materials that were used in the experiment.
2. Heat travels along a copper metal rod by ……

   (a) conduction (b) convection (c) radiation

3. What materials melts on the copper metal rod when it was heated?

   (a) water (b) shea butter (c) heat

4. What was used to heat the copper metal rod ……..

   (a) lighted candle (b) coalpot (c) wood

5. The shea butter changed from a …….state to a liquid state.

   (a) solid (b) liquid (c) gaseous

APPENDIX C

TIME: 30 minutes

INSTRUCTION: answer all questions.

1. Name two ways by which heat energy travels.
2. Heat from sun reaches us by means of ……..

(a)radiation (b) conduction (c) sound

3. Name two mateials used in the exsperiment.

4. Heat can radiate through gases and empty space. True / False

5. Radiation means to move out in all directions. True / False

MARKING SCHEME FOR APPENDICES

APPENCIX A

1. (c) Inflator
2. (a) air pressure
3. (c) radiation
3. (d) radiation
5. (b) conduction
6. (b) air
7. (b) space
8. (a) solid
9. (b) weight
10. (c) friction

APPENDIX B

1. i. candle ii. Copper metal iii. Shea butter
2. (a) conduction
3. (c) shea butter
4. lighted candle
5. (a) solid

APPENDIX C

1. i. conduction ii.radiation iii. Convection

2. radiation

3. i. candles ii. Lighter iii. Coalpot

4. True

5. True