

ISSN117-434X



GUSAU

JOURNAL OF EDUCATION

(GUJE)

VOL. 2, NO. 1.

JUNE, 1998

Published by Federal College of Education (Technical)
P. M. B. 1088, Gusau, Zamfara State

THE TEACHING OF ENVIRONMENTAL POLLUTION IN NIGERIAN PRIMARY SCHOOLS: A PRACTICAL APPROACH

BY
OSSAI A. UKPENE

ABSTRACT

The concern over our environment has in recent times engaged the attention of governments, non-governmental organisations and individuals in both developed and developing countries. Human activity is a major source of distortion in the natural ecological purity of the earth. The paper therefore advances the view that the efforts to control environmental pollution should start with the sensitization of the populace through various means and at various levels including the formal school system. The paper demonstrates how simple aspects of pollution could be successfully taught to primary school pupils using locally available resources and within the pupils' immediate experiences.

INTRODUCTION

Any day man wakes up he leaves a trail of wastes in his stead. This is due to his re-organisation of certain ecological variables within his environment to satisfy his basic needs. With increase in human population and increased desire to harness the good qualities of the earth, man ignorantly or intentionally destroys his natural ecological stability by emitting increased amount of wastes, the sum total of which culminates in what is termed "pollution", caused by agents called pollutants. Pollution may be defined as the process of releasing certain harmful substances into the environment thereby making it unsafe or unhealthy for human dwelling, (Ogunniyi, Okebukola and Fatunwase, 1982). The term is further defined as the discharge of waste substances or energy into the environment, through human activity, in amounts which are harmful to man, crops or animals (Ndu, Asun and Aina, 1991; Stone, Cozen and Ndu 1985). However, this paper wishes to define pollution as the gradual destruction of the environment resulting from the cumulative effects of human interplay with nature. These definitions presuppose that all man's endeavour to harness the natural resources of his environment creates different grades of substances, most of which have obvious deleterious effects.

To properly educate the primary school pupils on the nature, sources and effects of pollution, a practical approach towards the teaching of pollution in Nigeria primary schools is strategic.

SCOPE OF THE PAPER

It is realised that primary school pupils would accommodate a minimal dose of instructional details at a time. Hence only aspects of environmental pollution that could be easily observed or demonstrated are selected to cover some areas of air, land and water pollution respectively.

AIR POLLUTION

Air could be polluted through incomplete combustion of fuels which is made of hydrocarbons. For instance the burning of fuels in internal combustion engines of automobiles and factory machines and generators produce smoke containing unburnt hydrocarbons (Gottfried, et al 1983). The smoke contains carbon monoxide which when inhaled in large amount combines with hemoglobin and reduce the power of the blood to carry oxygen (Stone, et al.1985). Also produced is carbon dioxide which may increase environmental temperature and affect crops adversely by cutting the amount of solar energy reaching the soil surface. In a related write up Clarke, (et al. 1973) posit that: Smoke combines with water vapour to form fog which causes swelling in the respiratory tract known as bronchitis They further believe that:

Air pollution resulting from smoke also causes cancer. It is believed that products of the combustion of cigarettes or fumes of diesel engine and petrol engines could cause the cells of the lungs to behave abnormally, leading to cancer.

In addition, smoke irritate the eyes while soot darkens walls of buildings. Another important pollutant is noise, which may be explained as an unwanted sound. Noise is commonly suffered from grinding mills, music shops located within residential buildings, factory machines as well as the noise from children drumming with empty cans.

PRATICAL APPROACH TO THE TEACHING OF AIR POLLUTION

The primary school science teacher could demonstrate an aspect of incomplete combustion of hydrocarbons by borrowing a motor-cycle from any member of staff (if available). Then he switches on the engine, depresses the throttle handle until a thick cloud of smoke is belched out. The

teacher will then ask the students to breathe in the smoke and explain if the smoke has any effect on their breathing. In the absence of readily available motorcycle or any other automobile the teacher could arrange to take the learners to the nearest auto mechanic workshop.

Pollution from smoke could be demonstrated by lighting a stick of cigarette in an air-tight room. Pupils will inhale the smoke and comment on the effects. Noise pollution may be simply demonstrated by asking the pupils to drum on their desks or on empty containers brought into the class for that purpose.

Chemical pollution could be demonstrated by spraying a can of insecticide in the class. Alternatively, he can use a rotten egg (by breaking it) or by preparing hydrogen sulphide which gives the same effect.

LAND POLLUTION

Land pollution often results from untreated sewage from homes and offices which are indiscriminately deposited on the soil surface. This produces very offensive stench. It may also carry disease-causing organisms which could be washed into water bodies, or carried into the air and transmitted into human food, where they multiply and cause serious diseases. It is essential to discuss that refuse from homes and offices when heaped in particular places, often decay and produce offensive smell. Sometimes when heaped in drains the refuse could block waterways and cause flooding.

Metal scraps from abandoned automobiles as well as pieces of broken glasses disposed by factories and individuals occupy land areas and make the environment to lose its natural beauty as well as make the land unworkable for agricultural purposes.

When artificial fertilizers are excessively used on the soil, the crops use up the salts and the residue remain in the soil to increase its acidity or alkalinity (WAEC, 1989). On the other hand the fertilizers may be washed by surface run-offs into streams or fish ponds. Deliberate or accidental oil spillage make agricultural lands impoverished and unproductive. This prevents soil aeration and consequently hinders the respiration of soil organisms.

PRACTICAL APPROACH TO THE TEACHING OF LAND POLLUTION

An instruction on this could be commenced by questioning the pupils on how their faeces are disposed of. This may give them an insight into the meaning of sewage and its effects as a pollutant. The teacher may also organize an excursion to the vicinity of a pit latrine or a broken septic tank of

a water cistern toilet. The pupils may then be asked if they could perceive any signs of improper sewage disposal.

To demonstrate the effect of oil spillage on cultivable lands the primary school science teacher should source and obtain spent engine oil (obtainable from an auto mechanic workshop). Thereafter, he takes the pupils to a selected site on the school garden where crops are growing, and then the oil is properly poured on the surface of the soil making sure that it penetrates through the humus layers into the subsoil. The class would then continue to observe the growth/development of crops on that particular site. It must however, be emphasised that oil spillage is more extensive than this illustration.

WATER POLLUTION

As a result of man's interaction with his environment he discharges many wastes into water bodies either deliberately or accidentally. One major sources of water pollution resulting from urbanization is sewage disposal (Gottfried, et al. 1983). Sewage contains organic materials (in suspension and in solution) which act as food for micro-organisms which thrive on it (Clerke, el al. 1973). These writers further postulate that if bacteria are present in the sewage they multiply rapidly and use up much of the dissolved oxygen, thereby reducing the amount available for animal living in the water.

Under some agricultural practices in which artificial fertilizers are used, some dissolved solutions of it are washed up by the surface run-offs into the water. The solutions carried by the run-offs multiply algae populations which when they die and decay deplete the content of dissolved oxygen thereby exposing aquatic life to danger (Ulysses, 1982). The oxygen depletion process is called *eutrophication* (Gottfried el al. 1983).

Also, chemicals used in fishing or discharged from industries, oil spilled when loading or unloading oil tankers or from broken pipelines constitute important sources of water pollution and could cause inestimable damages. The oil prevent respiratory gases from dissolving into the water, thus aquatic life die of suffocation.

PRACTICAL APPROACH TO THE TEACHING OF WATER POLLUTION

The primary school science teacher should point out that in its natural (pure) state, water is meant to be properly aerated, and devoid of repulsive smell so as to enable it sustain its teeming population of plants and animals. And any circumstances causing it to lose any of its natural qualities automatically cause it to become polluted.

Effect of water pollution (resulting from oil spillage) could be demonstrated by using a glass or plastic aquarium, filled with water. Introduce some small fishes or tadpoles and add some groundnut oil or mashed fried groundnuts into the water. Initially the fishes may be seen feeding on them but later oil from the groundnut would be seen floating on top of the water. After two hours ask the pupils to observe the organisms and gives reasons for their answers.

PREVENTION OF POLLUTION

With the present increase in world population and the improvement in technology to satisfy man's increased desire for optimum comfort, the resources of the earth shall continue to suffer from over-exploitation. Presently it is feared that the ozone layer of the atmosphere is already suffering from depletion due to excess emission of industrial gases. For man to perpetuate the existence of his special as well as retain the aesthetic beauty and the ecological stability of the earth, it is necessary to employ restraint on the devastation of the whole earth.

Air pollution may be reduced by citing industries far away from residential quarters. Also appropriate filtering mechanisms should be installed (where they are not available) to absorb dusty pollutants from industrial wastes before they are released into the atmosphere.

To prevent the pollution of water bodies, untreated sewage should not be discharged into rivers. The public should be educated through the appropriate agencies on the dangers of defecating inside or near rivers and streams used for drinking and other purposes. The use of poisonous chemicals for fishing should be banned by legislation and offenders should be punished appropriately. The loading and off-loading of oil should be carefully done to minimise or avoid spillage. However, immediate measures should be taken to clean up any spillage when it occurs.

Land pollution could be by careful burying or burning of refuse. Metal scraps, empty cans and other industrial wastes should as much as possible be recycled in the industries. Intensive agricultural practices should be avoided to save soil from over-exposure to agents of erosion. Furthermore, the excessive application of artificial fertilizers should be avoided and ridges across the slope may be constructed to avoid the washing-up of the fertilizers into rivers/water bodies by the surface run-offs.

CONCLUSION

It is of vital academic as well as ecological interest to seriously consider the issue of environmental pollution whenever a reference is made to the concept of the environment. With nations presently struggling for

global industrial/ technological supremacy, it is feared that the earth would sooner or later become a reservoir of waste against its endowment of natural beauty and stability. To avoid the total destruction of the earth's viable resources and resorts, man must exercise caution in a meeting dangerous effluents into the environment.

REFERENCES

Clerke, R. A., Booth P.R., Grisby, P.E. Hardow, J.F. and Irvine, J.S. (1973):

Biology by Inquiry 2. London: Heinemann Educational Books Ltd.

Gottfried, S. Madraso, G., Motz, L., Olenchak, J., Sinclair, D., Skoo G.,

(1983): *Prentice Hall Biology*. New Jersey: Prentice Hall.

Ndu, F.O.C., Asun, P. and Aina, J.O. (1991). *Senior Secondary Biology I*.

Ibadan: Longman Nigeria Ltd.

Oguniyi, M. B., Okebukola, P:A.O., and Fatunwase, A. (1988). *Primary*

School Science and Methods. Ibadan: Heinemann Educational Books

(Nig) Ltd.

Stone, R. H. Cozen, AB, Ndu, F.O.C. (1985). *New Biology for West African*

Schools. Ibadan: Longman Nigeria Ltd.

Ulysses S.J. (1982): *Fertilizers and Fertility*. New Delhi: Prentice Hall of

India Private Limited.

West African Examination Council (1989): Final Marking Scheme: Biology

II, November SC/GCE. Yaba, Lagos.