Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.4, No.19, 2013

Effects of Language of Instruction on Junior Secondary School (JSS) Students' Academic Achievement in Basic Science

Ezeudu, Florence Obiageli (Ph.D)
Department Of Science EducationFaculty Of Education
University Of Nigeria, Nsukka ,Enugu State ,Nigeria
E-Mail : Flossyezeudu@Yahoo.Com

Being A Paper,Presented At The 2011 Igbo Studies Association (Isa) Conference In Washington Dc.APRIL, 2011

Abstract
This study sought to find out the effects of using Igbo language as a medium of instruction on academic achievement of Junior Secondary School I Students in Enugu State. The study was carried out in two schools (one male and one female) in Oji-River Local Government Area of Enugu State, Nigeria. Two intact classes from each of the schools were randomly assigned to either experimental or control conditions. The experiment lasted for four weeks. It started with a pretest and ended with a posttest using Basic Science Achievement Test (BSAT). Means and Standard deviations were used to answer the research questions whereas analysis of covariance (ANCOVA) was the statistical tool used to test the hypotheses. The result showed that the students who were taught with Igbo language performed better than the control group taught with English language. Based on this result, the researcher recommended the use of Igbo in teaching Basic Science, which helps to relate the subject to the immediate environment on the learners.

Introduction

Language is a means of preserving the people's culture. Language and culture are inseparable and to separate a child from his language and culture at an early stage of his/her school education is to make him/her have no regard for his culture (Umo, 2001). Using another language other than the mother tongue as a medium of instruction impairs the development of the child's personality and ability (Olarewaju2006). Igbo language is the mother tongue of all the Igbos. Igbos are a group of dedicated, strongly built, hard working and resourceful people living in the south east geopolitical zone in Nigeria comprising Anambra, Abia, Ebonyi, Enugu, Imo as well as some parts of Rivers, Delta, Benue and Kogi States. Igbo language is very important to all the members of Igbo race. Mother tongue helps in understanding the values and problems of the society (Awoniyi, 1982). So the qualities of the Igbo's can be seen from the Igbo language. Nkeiruka then comes at the appropriate time to let the Igbos reflect on the ways to preserve our culture through the Igbo language.

Colonialism brought in English language as a lingua franca for the country Nigeria. The idea then was for the colonial missionaries to communicate the Christian faith to the people. So far so good, one can then pose to ask after 50 years of the use of English language as official means of communication in government and business, where are we? We have not developed technologically and also we have lost our rich indigenous culture especially the cultural heritage of Igbo land which could have helped us. A research showed that language is responsible for the Japans first rank in the whole world in the area of technology (Fafunwa, 1989). Japan, Brazil, Taiwan, Holland, India, China, Russia, France and Germany do not speak English as their national language but they have developed scientifically and technologically (Eze and Eze, 2008). Weakness of science and technology taught in Nigerian schools is that they are usually divorced from the cultural practices and thinking of the learners (Ojo, 1998). The child learns faster, develops healthy personality and has a sense of belonging when the communication of science, technology and mathematics (STM) is done using the mother tongue (Nsofor 1998).

About 70% of Nigerians live in rural areas and English is not emphasized in their homes. Using the Igbo language at home and English language at school creates a gap between the home and the school. Interference of language used at home with language of instruction and learning are major factor contributing to under-achievement in chemistry (Busari and Ajeyalemi 1986). If a child lacks the appropriate level of development in his/her mother tongue, he/she will find it difficult to learn with his/her peers and this retards his/her learning rate (Azikiwe 1991). Unless we teach our children to learn the basis of STM in their mother tongue, the product will never be fruitful (Elugbe, 1990). How can the product of STM education be fruitful with the level of under-achievement in our educational system? Among the problems encountered by pupils in West African Senior School Certificate Examination (WASSCE) is difficulties in understanding the language used in the question papers (Akinde, 1986). The researcher mentioned that poor language development contribute to students' under-achievement. Under-achievement and lack of interest in sciences had contributed to the students

move from science subjects to Arts subjects. The admission policy of 60:40 of Science courses to Art courses is never met. Then science and technological development is still a dream that cannot be realized.

It is not a surprise that the Federal Republic of Nigeria stipulates in The National Policy on Education (NPF) that mother tongue must be learned as core subject in junior basic school levels (FRN, 2004). The same policy also stated that the medium of instruction in the Junior Basic Education level should be in mother-tongue or the language of the immediate community of the learners. Could not this language policy be extended to Senior Basic Education level? The researcher became worried about the effectiveness of the language policy and also wondered if the teachers observe this policy.

Igbo language has many dialects and this makes it a difficult subject (Nwachukwu, 1983). Hence students and teachers battled with the effect of dialects. A teacher posted to a certain area of Igbo land may find it difficult to apply examples from the immediate environment of the learners. Could science teachers translate scientific terms, expressions to local languages and teachers who are not native speakers of these languages will they have to write science concepts in these local languages? English language has uniformity in orthography. It has single spelling and punctuation system and these are lacking in Igbo language which also lack terminologies for the science concepts. But contrary to this view, Igbo language has vocabularies to express scientific words (Eze and Eze 2008).

Science concepts are mostly built up at the junior secondary school (JSS) Basic Science. One of the objectives of teaching Basic Science is to teach students how to tackle some of the questions that arise from their observations of his/her own environment (Bajah, 1983). Basic Science is a study that is close to nature utilizing the entire natural phenomenon. Most Nigerian students live in rural areas and are surrounded by natural settings. They learn the names of things in their environment in their native language. On coming to school those things will be named in English language and this creates a bridge which could affect their achievement and interest in the subject. The teaching of the students through the use of the environmental examples will make the teaching lively and to bring the lesson home (Nwadike 2002). According to the researcher, if it is done the students will develop interest in the subject and their achievement will be enhanced. This is also applicable to Basic Science.

This study is based on a sound theory. Lev Vygotsky (1896-1934) was a Russian psychologist who worked on social learning theories and he stated that people learn through their interaction and communication with others. Vygotsky said that culture is the determining factor for knowledge construction. He argued that language is the main tool that promotes thinking, develops reasoning and supports reading and writing. He also started that language is a tool the child uses for social interaction. Application of his theory on thought and language to science education has significant to the growth of students in their immediate environment. For students to achieve in Basic Science, they must be taught by the language of their culture and it is only through this language that they interact with their environment.

Some studies reported remarkable difference in academic achievement of students taught with mother tongue and those taught in English language. Achievements of elementary school children in science on the media of instruction were compared and the result showed that pupils in the experimental group (mother tongue group) performed significantly better than those in the control (English group) (Ehindero, 1980). The present work is to be done in Basic Science and at JSS level. Could it give the same result? An experiment in which those taught in the mother tongue performed better than those taught in English was conducted (Olarewaju and Akinwumi 1988). A study on the Efficacy of the mother tongue in reducing test Anxiety of secondary school students in Biology was done (Jimoh and Salawu 1998). They used 170 (78 boys and 92 girls) of senior secondary II students in Ede North Local Government Area of Osun State of Nigeria. Test Anxiety Scale (TAS) was used to measure the levels of test anxiety. The result showed that students taught Biology in Yoruba language performed significantly better than those taught in English language. Could this be true of Igbo language and in Basic Science? The researches reported above, Yoruba was the mother tongue used. Conducting experiment using Igbo language was done by Umo (2001) who investigated the “effect of Games on Achievement and interest of junior secondary school students in Igbo Grammar”. The researcher did the study using 197 JSS II students. Among the findings is that Game strategy was not a significant factor on students’ achievement in Igbo grammar. The present work is different from the above work because, the researcher is working on Basic Science and looking for the effect of JSS I students’ achievement in Basic Science. Female students achieved higher than their male counterparts in language instruction (Umo, 2001). While some other studies indicated that males do better in language than the females (Ohuche, 1982). Some other researchers found that gender is not a significant factor in achievement of students in languages (Ezike and Nwana 1987). These inconsistent reports by many researchers prompted this researcher into finding out if using Igbo as a medium of instruction for Basic Science could make a significant change on gender. Also this researcher sought to find the effect of Igbo language as a medium of instruction on JSS I students’ achievement in Basic Science.

Professor Babs fafunwa of blessed memory and his team had six years projects at Obafemi Awolowo University, Ile-ife in Nigeria, in which they used the Yoruba language as the medium of scientific expression.

The first set of university graduates in Yoruba language was in 1969. The research showed that science subjects could be taught well in Yoruba. To date, very little or nothing has been done to train University graduates in sciences and in Igbo language. Can this be done? Surprisingly many schools especially private schools forbid the use of Igbo language in schools. In our primary and secondary schools there is always an inscription on the notice boards and in all classrooms that Igbo speaking is strictly prohibited. Some Ibo children do not want to be identified as Igbos more so if they live outside Igbo speaking areas (Chukwumerije, 2000). Many children cannot name our local birds, plants, animals, fishes etc in Igbo (Nwadike, 2006) and some of them cannot pronounce their Igbo names well.

The coming of Nkiruka at this time when there is the need to document Igbo cultural values that is facing the danger of extinction is highly welcomed. A necessary need for Nkiruka is for us to use Igbo language as a medium of communication in STM education in general and in Basic Science in particular, to enable our children explore the world around them and to make discoveries that can lead Nigerian country technologically higher.

The purpose of the study was to find the effect of language of instruction on junior secondary school students' achievement in Basic Science. Specifically, the study sought to: (a) Compare the mean achievement of Basic Science students using Igbo language and English language as media of instruction (b) ascertain whether differences exist in students' achievement due to gender.

The findings of this study will be of much importance to the government, school administrators, language teachers, students, policy makers, general public and Igbo race.

The scope of the study was restricted to public secondary schools in Oji-River Local Government area of Enugu State in Nigeria. The chose is because they are government owed and are expected to operate with government minimum standards. JSS I students were used because they are near to primary school which had been assumed to be taught primary science in the mother tongue and also in the Nigeria setting, they are still within the basic education level.

The sense and sense organs were used because that was in the students' scheme of work during the period of the research.

Research Questions

1. Which group of students achieved better in BSAT: those taught in Igbo Language and those taught in English language.
2. Had gender any effect on students' achievement in BSAT?

Hypotheses

1. There is no statistical significant difference ($P < 0.05$) between the mean achievement scores of students taught in Igbo language and those taught in English language as measured by BSAT.
2. There is no statistical significant difference ($P < 0.05$) between the mean achievement scores in BSAT by gender.

The design of this study is quasi-experimental design of non-equivalent control group. The subjects were not randomly sampled and assigned to control and experimental groups rather intact classes were used (Ali, 2006). This design is also called a non-randomized pre-test, post-test control group design.

O_1 X O_2

……

O_1 -X O_2

Where:

O_1 = pretest scores of the two groups.
O_2 = posttest scores of the two groups
X = experimental treatment using Igbo language
-X = control treatment using English language
…….. = showing that both experimental and control groups are not randomly composed.

The study was carried out in Oji-River Local Government Area of Enugu State in Nigeria. The chose of the area is because the area is still virgin for research while Nsukka Local Government Area where the researcher is resident is over flogged by research. Also the researcher is from the area which made for effective supervision. In the two schools which were randomly selected (one male and one female) two intact classes of JSSI students were randomly assigned to the treatment conditions. The sample consisted of 79 boys and 94 girls making a total of 173 students.

The researcher adapted Basic Science Achievement Test (BSAT) (see appendix iii) and lesson notes on sense and sense organs (see appendix i and ii). The instruments were originally constructed and validated as ISAT by Ezeudu (2004).

Experimental procedure began with the training of the Basic Science teachers in both schools. This took place during the mid-term break of the school which lasted for one week. The teachers were trained on the use of lesson notes in both English and Igbo languages as well as in the research conditions. Also the contents, objectives and activities of the students were discussed during the training. The students were pre-tested before the teaching. The experiment lasted for four weeks after which the post-test was administered to the two groups. The scores for both tests were collected and the teachers marked the scripts.

Control of extraneous variables was done. The researcher took care of the following extraneous variables:

Experimental bias: The teaching for both the experimental and the control groups was not done by the researcher but by the regular class teachers. This was to avoid Hawthorns effect.

Teacher variable: The Basic Science teachers taught the students in their normal classrooms and laboratories. There was training programme for the teachers. During the period, the validated lesson plans for both the experimental and the control groups were discussed between the teachers and the researcher. The researcher gave the teachers common instructions. There were trial teachings by the teachers and the researcher watched and corrected them. All these were to ensure uniformity.

Class interaction: All the students received the lessons in their repective normal classrooms. The researcher instructed the teachers not to give notes or assignments to the students so as to avoid exchange of ideas outside the classroom.

Effects of pretest on posttest: The pretest and posttest administration gap was four weeks and the period was long enough not to permit the pretest to affect the posttest scores and also to prevent the students from becoming familiar with the test items.

Initial Group Difference. It was not possible to do complete randomizations, intact classes were randomly assigned to treatment conditions. Also Analysis of Variance (ANCOVA) was used to bridge the gap of non-equivalence of the intact classes.

Means and standard deviation were used to answer the research questions while the analysis of covariance (ANCOVA) was used to test the hypotheses at the 0.05 alpha levels. ANCOVA was used to serve as a controller for the initial differences across the groups as well as increasing the precision due to the extraneous variables thus reducing error variance.

Results:

The results are presented in tables below:

Research Question 1: Which group of students achieved better in ISAT: those taught in Igbo language or those taught in English language.

Table 1: Means and Standard Deviations of pre-test scores and post-test scores of experimental and control Groups.

TREATMENT GROUPS		PRETEST SCORES	POSTTEST SCORES
Experimental	Mean	46.77	68.43
	N	88	88
	Std Deviation	6.64	8.30
Control	Mean	44.53	61.26
	N	85	85
	Std Deviation	5.23	5.87
Total	Mean	45.67	64.91
	N	173	173
	Std Deviation	6.08	8.04

Table 1 shows that for the pretest, the mean scores of the experimental group is 46.77 with the standard deviation of 6.64 while the posttest mean score is 68.43 with the standard deviation of 8.30. For the control group, the mean achievement score for the pretest is 44.53 with the standard Deviation of 5.23 and posttest mean score of 61.26 with standard deviation of 5.87. Therefore there is a mean gain of 21.66 in the experimental group and 16.73 in the control group.

Table 2: Means and Standard Deviations of pretest and posttest scores based on Gender.

GENDER OF SUBJECTS		PRETEST	POSTTEST
Males	Mean	46.08	65.79
	N	79	79
	Std Deviation	5.60	7.55
Females	Mean	45.33	64.17
	N	94	94
	Std Deviation	6.46	8.40
Total	Mean	45.67	64.91
	N	173	173
	Std Deviation	6.08	8.04

From table 2, the result shows that the males had pretest score of 46.08 with the standard deviation of 5.60 and posttest scores of 65.79 with the standard deviation of 7.55 and the females had pretest scores of 45.33 with the standard deviation of 6.46 and a posttest score of 64.17 with the standard deviation of 8.40.

Hypotheses

1. There is no statistical significant difference ($p < 0.05$) between the mean achievement scores of students taught in Igbo Language and those taught in English Language as measured by BSAT.
2. There is no statistical significant difference ($p < 0.05$) between the mean achievement scores in BSAT by gender.

Table 3: Descriptive statistics of posttest scores of BSAT in Treatment by Gender.

TREATMENT GROUP	GENDER OF SUBJECTS	MEAN	STD DEV.	N
Experimental	Males	69.41	7.13	41
	Females	67.55	9.18	47
	Total	68.43	8.30	88
Control	Males	61.84	5.87	38
	Females	60.79	5.90	47
	Total	61.26	5.87	85
Total	Males	65.79	7.55	79
	Females	64.17	8.40	94
	Total	64.91	8.04	173

Table 4: Univariate Analysis of Variance (ANCOVA) of Posttest scores in BSAT (Treatment by Gender) with Pretest scores.

SOURCE	Type III sum of squares	df	Mean Squares	F	Sig.	Partial Eta Squared
Corrected model						
Intercept	4014.63	4	1003.59	23.77	.00	.36
Pretest	4815.73	1	4815.73	14.04	.00	.41
Treatment	1688.48	1	16688.48	*39.99	.00	.19
Gender	1490.47	1	1490.47	*35.30	.00	.17
Treatment* Gender	51.99	1	51.99	1.23	.27	.01 NS
Error	3.74	1	3.74	.09	.77	.00 NS
Total	7094.16	168	42.23			
Corrected Total	739955.00	173				
	11108.52	172				

a. R Squared = 0.36 (Adjusted R Squared = 0.35)
173 cases were processed. O cases were missing.
* Significant at $P < 0.05$ level.
NS = Not significant.

The F-ratio calculated for the effect of Igbo language on student's achievement in BSAT is 35:30. Therefore the researcher rejects the null hypothesis of no significant difference due to treatment condition. This means that there was a significant difference in the mean achievement scores of student taught integrated science using Igbo language and those taught with English language. F-ratio calculated for the gender is 1:23 and therefore the

effect of gender is not significant. The F-calculated for the interaction of gender and treatment is 0.09 and so the interaction effect due to Igbo language and gender is not significant.

Discussion

From table 1, the students taught with Igbo language had a higher mean score than those taught with English language, which means that those taught with Igbo language achieved better than those taught in English language. Also table 4 shows that there is a significant effect due to Igbo language on student's achievement in integrated science (BSAT). This finding is in line with other works done by Ehindero (1980), Olarewaju and Akinwumi (1988) Jimoh and Salawu (1998). The work is not in line with the research done by Umo (2001) in which the game strategy was not a significant factor on student's achievement in Igbo grammar.

Table 2 and 3 show that there is no significant effect of Igbo language and gender. Both male and female students achieved better due to treatment. This means that Igbo language has the same influence on boy and girls and therefore it does promote gender stereotype.

This result is in line with other studies done by Ezike and Nwana (1987) but not in line with Umo (2001) who reported that female student achieved better than the male students in language instruction. Table 4 indicates that there is no significant interaction by gender and by treatment on achievement of students in integrated science. It means that the student's achievement is not consistent in the treatment across Igbo language and gender.

Conclusion: From the findings of this study the following conclusions are made:

The students taught Basic Science using Igbo language achieved significantly better than those taught the same Basic Science using English language.

There was no significant difference on achievement of boys and girls using Igbo language and English language.

Interaction of Igbo language and gender on achievement of students in Basic Science was found not to be significant.

Recommendations

Curriculum planners and policy makers should stabilize and standardize Igbo language for effective use in teaching Basic Science in particular and in science in general.

Government at all levels, school administrators, language teachers should monitor the use of Igbo language as stipulated by the national policy on education.

Institution training teachers (Faculties of Education, Institutes of Education, National Commission for Colleges of Education (NCCE), and National Teacher's Institute (NTI) should train teachers to be vast in Igbo language.

The general public and Igbo race should advocate for the use of Igbo as medium of communication in sciences as the best way of making our Igbo language not to die.

The Federal Government should enforce and sponsor all efforts to use Igbo language to teach Basic Science in particular and science in general as the only means for our technological advancement.

REFERENCES

Ali (2006). *Conducting research in education and the social sciences. Enugu: Tashiwa Networks Limited.*

Akinde S. (1986). Public examinations as a feedback mechanism. *A conference paper presented at the Faculty of Education, Ibadan.*

Awoniyi T. A. (1982) *The teaching of African languages*. London: Holdef and Stoughton.

Azikiwe Uche. (1991) *Teachers perception of constraint to mother tongue policy and strategies for effective implementation*. Eliamatador, Egbe, T. O., Aderonmu, W. O., Olaitan, S. O., Afe, J. O. (Eds). Nigeria Educational Researchers Association, Lagos: Kola Okenlawon Publishers Limited.

Bajah, Tunde Sam (1983). *Teaching integrated science creativity.* Ibadan: University Press.

Busari Olanitemi and Ajeyalemi Duro (1986). Factors associated with under-achievement in "O" level chemistry. An investigation into classroom processes, examination performance and teachers and pupils opinions. *27th Annual conference proceedings of Science Teachers Association of Nigeria (STAN)* : 250—256.

Chukwumerije, O.(2000) Importance of language < Ltt//www. Ganiji com/news 1822: Ltm> (accessed November 12 2010).

Ehindero, O. J. (1980). The influence of two languages of instruction on students level of cognition development and achievement in science. *Journal of Research in Science teaching,* 17 (4), 283—288.

Elugbe, Ben Obi. (1990) *Nigerian language and national development*. Agbor, Nigeria: Central Books Limited.

Eze, Simon and Eze, Caroline. (2008) Using Nigeria indigenous languages to promote science and technology application. *A paper presented at the 4th annual conference of the Igbo Studies Association held at the University of Nigeria, Nsukka.*

Ezeudu, F. O. (2004). Effects of using Igbo language as a medium of instruction on junior secondary school (JSS) students' achievement in integrated science.

Ezike, Romanus. and Nwana, Obioha Chima. (1987). Language preference in the teaching of mathematics." *Nigerian Research in Education*, IV. 92-98.

Fafunwa, Babs., Macaulay. I., and Sokoga J. A (1989). *Education in mother tongue. The Ife Primary Education Research Project* Ibadan: University Press Ltd.

Federal Government of Nigeria. (2004). *National Policy on Education*. 4th Edition. Lagos, Nigeria: NEDRC Press.

Jimoh M.A. and Salawu B.M.(1998). Efficacy of the mother tongue in reducing test anxiety of secondary school students in biology." *39th Annual conference proceedings of Science Teachers Association of Nigeria*. 146-148.

Nsofor C. C. (1998). Language issues in communicating science technology and mathematics. *39th Annual conference proceedings of Science Teachers Association of Nigeria*. 110 -114.

Nwachukwu P. A.(1983) *Towards an Igbo literary standard*. London: Regan Paul International.

Nwadike Innocent (2002). *Igbo language in education: A historical study*. Obosi: Pacific Publishers.

Nwadike. Innocent. (2006) Language, culture and endangerment in Nigeria. *A paper presented at the 11th annual national conference of the association for Promoting Nigerian Languages and Culture (APNILAC). Imo State University. Owerri*.

Ohuche, N. M. (1982) The Development of the horizontal vertical co-ordinate reference system by some Nigerian (Igbo) children and young adult. Unpublished Ph.D Thesis. University of Nigeria, Nsukka.

Ojo David.(1998) Cultural resources for communicating science and technology concepts in schools. *39th annual conference proceedings of Science Teachers Association of Nigeria (STAN)*. 75—79.

Olarewaju, A. O.(1986). Students under-achievement in science, some suggested remedies. *27th annual conference proceedings of Science Teachers Association of Nigeria (STAN)*. 143--147.

Olarewaju, A. O.(2006). Using Nigerian language as media of instruction to enhance science and technology development, an action delayed <http://www.newhorizon.Org/intoscience.Org. > (accessed November 12 2010).

Olarewaju, A. O. and Akinwumi (1988). Remedying students' under-achievement in science through the use of mother tongue as a language of instruction: an experimental approach. Nigeria Journal of Curriculum Studies. 2, 41 - 49.

Umo, Uju Clara.(2001). Effect of games on the achievement and interest of junior secondary school students in Igbo grammar. *Unpublished Ph.D. thesis. University of Nigeria, Nsukka.*

APPENDIX i

SCHEME OF WORK

1. The sense organs of a mammal
2. The eye
3. The ears, tongue & nose
4. The skin

A note of lesson in Integrated Science

Subject: Integrated Science
Class: JSS I
Average age: 13years
Date: 25/10/2010
Time: 40 minutes

Content/Topic: The sense organs and the sense of sight - the eye.

Specific Instructional Objectives: At the end of the lesson, the students should be able to:

1. identity the special parts of the body that are associated with the senses.
2. say the main defects of the eye and the corrective measures.
3. list ways of taking care of the eye.

Entry behaviour: The students had studied reflex action.

Test on Entry behaviour: The teacher asks the students the following questions. What are the responds to the following stimuli (i) Hot object on the hand (ii) Sudden bright light (iii) Dust in the nose (iv) Sudden loud noise (v) Food in the gullet.

Instructional Materials: Charts showing the vertical section of the eye, the short sight and its correction and the long sight and its correction.

Instructional procedure:

Content development	Teacher's activities	Students' activities	Strategies
Introduction	The teacher walks into the classroom blinking the eyes, sneezing, swallowing, and looking intensively at the students.	The students being attractive to the teacher's behaviours look at the teacher.	Set induction
Sense organs.	The teacher tells the students that there are special parts of our body which respond to external stimuli. They are called sense organs. He/she writes on the board Senses Sense Organs Seeing Eyes Hearing Ears Smelling Nose Tasting Tongue Touching Skin He/she explains the above and tells the students that the sense organs help us to get information about the world around us and they also help us to avoid dangers.	The students listen to the teacher's explanations. They answer the teacher's questions when asked. They also ask questions.	Explanation, Repetition, Stimulus variations, Questioning .
The eye	With the diagram of the eye, the teacher explains the structure of the eye. He/she also explains how the light rays enter the eyes and how the message gets to the brain and we see the object.	The students make contributions to the discussion. They ask questions.	Discussion, Repetition.
Eye defects	The teacher explains with the diagrams the three main defects - long sight (hypermetropia), short sight (myopia) and Astigmatism With the diagrams he/she explains how they can be corrected through the use of appropriate glasses. He/she explains other defects like colour blindness, night blindness, blindness, conjunctivitis, cataract and their causes.	The students listen and answer some questions. They ask questions They contribute to the causes of blindness.	Explanation, Repetition, The use of examples, Stimulus variation.
Care of the eyes	The teacher asks the students to say how to take care of the eyes.	The students say how to take care of the eye.	Discussion, Questioning.
Evaluation	The Teacher asks the following questions: (i), Identify the parts of the body that are associated with our senses. (ii) What are the main defects of the eyes and the corrective measures? (iii) List the ways to take care of the eyes.	The students answer the teacher's questions.	Closure.

Summary: The teacher gives the summary of the lesson to the students by writing short notes on the board.
Assignment: He/she asks the students to find out the instruments we use to help us see objects that are very small.

A note of lesson in Integrated Science.
Subject: Integrated Science
Class: JSS I
Average Age: 13years

Date: 01/11/2010
Time: 40minutes
Content/Topic: Senses of smell and taste - the nose and the tongue
Specific Instructional Objectives: At the end of the lesson, the students should be able to:

i) name the nerve that send message from the nose to the brain.
ii) identify the different taste areas of the tongue and the different tastes.
iii) draw the tongue showing the areas sensitive to taste.

Entry behaviour: The students had studied the eye as the organ of seeing.
Test on Entry Behaviour: The teacher asks the students questions on the assignment given during the last lesson like what objects do you use to see things that are small? – microscope, hand lens, telescopes, and glasses. He/she asks than to say what happens when they stay near a decayed animal which they cannot see. what tells them that it is decayed.
Instructional Materials: Perfumes, Sugar, Salt, Quinine, Unripe Orange.
Instructional Procedure:

Content development	Teacher's activities	Students' activities	Strategies
Introduction	The teacher walks into the class and spray some perfumes. He/she asks the students to breaths in and out.	The students breathe in and out.	Set induction.
The nose	The teacher tells the students that the nose is the organ of smell, that there are two nostrils, which opens to the outside. He/she asks them to touch their nose. He/she explains the mucus and the functions, how the nose acts as organ of breathing and smelling. He/she explains the functions of the olfactory nerves that lead to the brain.	The students touch their nose and they notice the watery substance. They listen to the teacher's explanations and they ask questions.	Explanation, The use of examples, Stimulus variations, Demonstration, Questioning.
Care of the nose	The teacher asks the students to say how to care for the nose. He/she makes some contributions.	The students say how to care for the nose.	Questioning, Repetition.
The tongue	The teacher tells the students that the tongue is the organ of taste. He/she asks the students the following questions. Open your mouth wide and look at the mirror. Put a clean finger over the upper surface of your tongue. What did you see and feel? The teacher blind folds the students and ask them to identity the following from their taste: banana, onions, salt, etc.	The students observe their tongue from the mirror. They feel the taste buds (papillae) with their fingers. The students identify the foods and fruits from their tastes.	Explanation, Repetition, The use of examples, Demonstration.
The care of the tongue	The teacher asks the students to say how to care for the tongue.	The students say how to care for the tongue.	Questioning.
Evaluation	The teacher asks the students to say the nerve that send messages from the nose to the brain. The teacher asks the students to put the following solutions in their mouth and note the area(s) where they feel the taste and use the information to draw the tongue. (sugar, salt, quinine, unripe orange).	The students answer the teacher's questions. They taste the given solutions and use the identified taste areas to draw the diagram of the tongue.	Closure.

Summary: The teacher puts up some notes on the topic for the students to copy in their notebooks.

Assignment: The teacher asks the students draw the tongue showing the different area of tastes.

A lesson plan on Integrated Science

Subject: Integrated Science
Class: JSS I
Average Age: 13years
Date: 8th November, 2010
Time: 40minutes
Content/Topic: Senses of hearing and Balance - the Ears
Specific Instructional Objectives: At the end of the lesson, the students should be able to:

i) say how sound enters the outer ear (pinna) and go to the middle ear, to the inner ear and to the brain and we hear the sound.
ii) mention the part of the ear responsible for balancing.
iii) list how to care for the ear.

Entry behaviour: The students had studied the tongue and the nose.
Test on Entry behaviour: The teacher asks the students the following questions: What is the name of the organ of taste? Which part of the nose transmit message from the nose to the brain? What is the taste of the sweat? How do you care for the nose and the tongue?
Instructional Materials: A radio, whistle and a diagram of the vertical section of the ear.
Instructional procedure:

Content development	Teacher's activities	Students' activities	Strategies
Introduction	The teacher enters the classroom blowing the whistle.	The students are attractive by the nose.	Set induction.
The ear	The teacher tells the students that the ear is the organ of hearing and balancing. He/she puts up the diagram of the ear and use it to explain the outer ear (pinna), the middle ear and the inner ear. He/she explains the functions of the structures.	The students listen to the teacher. The students ask questions where they do not understand.	Explanation, Stimulus variations.
Balancing	He/she explains how the three semicircular canals help us to maintain balances.	The students listen to the teacher's explanations.	Explanations.
How we hear sounds	The teacher blind folds a student and place the radio at different sections of the classroom and ask the student to get the radio. The teacher explains how the sound that enters the pinna gets to the brain.	The students use only the sound to identify the radio and they ask the teacher some questions.	Questioning, Demonstration, Questioning, Explanations.
Care of the ear.	The teacher through discussion with the student's identity how to take care of the ear.	The students help to identify how to take care of the ear.	Discussion.
Evaluation	The teacher asks the students the following questions (i) how do the sound that enters the outer ear, gets to the brain and we hear the sound? (ii) Which part of the ear is responsible for balancing (iii) List how to care of the ear.	The students answer the teacher's questions.	Closure.

Summary: The teacher allows the students to draw the diagram of the ear. She/he also writes some short notes on the board for the students to copy.
Assignment: The teacher asks the students to find the ear defects and correction measures.

A note of lesson on Integrated Science

Subject: Integrated Science
Class: JSS I
Average Age: 13 years
Date: 15th November, 2010
Time: 40minutes
Content/Topic: The sense of touch and feeling -The skin
Specific Instructional Objectives: At the end of the lesson, the students should be able to:

(i) name some parts of the skin and what they do.

(ii) identify different measures to take care of the skin.

Entry behaviour: The students had studied the tongue, the nose and the ear.

Test on Entry behaviour: The teacher asks the students these questions: What is the taste of the sweat? What is the smell of burning food? When does one use hearing aids? When you feel cold, how does it reflect on your nose and the skin?

Instructional Materials: Different soaps, body oils, and the diagram of the structure of the skin.

Instructional procedure:

Content development	**Teacher's activities**	**Students' activities**	**Strategies**
Introduction	The teacher comes into the class with different soaps and body oils.	The students are attracted to the items brought by the teacher.	Set induction.
The structure of the skin	The teacher puts up the diagram of the skin and explains the structures. The teacher explains how the skin helps to regulate the body temperature i.e. sensitivity of the body to heat and cold. He/ she explains other sensitivities like touch, pressure, and pain. He/she uses the nerve endings to show their sensitivities in our skin for example- Meissner's corpuscle-touch, Free-nerve endings - pain, Pacinian corpuscle - pressure and Hair plexus –touch and pain. He/she explains the work of the following parts of the skin -sebaceous gland, sweat gland, hair follicle etc.	The students listen to the teacher's explanations and ask questions:	Explanation, Questioning.
Care of the skin	The teacher leads the students to list the measures to take care of the skin. She/he shows them the different soaps and oils that can be used to take care of the skin.	The students list the ways to take care of the skin.	Stimulus variation, Questioning.
Evaluation	The teacher asks the students these questions: (i) Name some part of the skin and what they do? (ii) How do you take care of the skin?	The students answer the teacher's questions.	Closure.

Summary: The teacher writes some points on the board for the students to copy.

Assignment: He/she asks them to observe the hairs on their skin

APPENDIX ii

Lesin nootu maka nkuzi he ọmụmụ sayensi.

Klasị : Ndị afọ nke mbụ na koleji

Afọ : iri afọ na atọ

Deetị : 25/10/2010

Isiokwu : Akụkụ ahụ na –enyeaka ịmata ihe dị na gurugburu anyị.

Ebumnuche Kpọmkwem : Na ngwụcha ihe ọmụmụ a, ụmụ akwụkwụọ ga:

(1) Akọwapụta akụkụ ahụ mmadụ nke na-enyeaka imata ihe na- eme na gburugburu anyi.
(2) Ha ga-akọwa ihe bụ isi sekpụ ntị na nsogu anya na ihe a ga-eji bochie ya.
(3) Ha ga-akọwa otu a ga-esi echekwaba anya n' ụzọ dị iche iche.

Ihe Umụaka mabụ: ụmụaka amụọla mgbe mmadu ji amata na ihe mere ya.

Ajụjụ gbasara ihe ha mabu – onye nkuzi ga-ajụ ha ajụjụ ndị a:

Kedu ihe na-eme mgbe i mere ihe ndị a? Imetu igwe dị ọkụ, ọkụ na-acha gbaa nke i maghi mgbe o bidoro. Nnukwu mkpọtụ, na mgbe nri dị n' akpịrị. Ngwa nkuzi- eserese nke na-egosi anya e kere ụzọ abụọ ha nhatanha. mmadụ ahughị ihe nọ ya nso na ihe a ga-eji gbochie ya na mmadu ahụhị ihe anọghị ya nso na ihe a ga –eji gbochie ya.

Usoro nkuzi:

<table>
<tr><td>Uzọ nkọwami isiokwu</td><td>Ihe onye nkuzi na-eme</td><td>Ihe ụmụ akwụkwọ na-eme</td><td>Usoro nkuzi</td></tr>
<tr><td>Mmalite</td><td>Onyenkuzi batara na klasị na-eti bi anya, na-eze uzere, na-elo akpiri ya ma lekwasi umuaka anya di egwu.</td><td>N’ ihi na agwa onyenduzi masiri ụmụaka, ha lekwa siri anya ha ebe onyenkuzi no.
Ụmụ akwukwọ gere onyenkuzi nti. Ha zara ajuju.</td><td>Ikpali mmụọ ụmụaka. nkọwa, kwum kwugha uzọ dị iche iche eji akuzi ihe. Ajụjụ di iche iche.</td></tr>
<tr><td>akụkụ ahụ na-eme ka anyi mara gburuguru anyị</td><td>Onyenkuzi ga-eme ka ụmụaka mara na e enwere akụkụ ahụ mmadu nke na-eme ka anyi mata ihe di anyị nso adịghị anyị. Ọ ga-edepụta akụkụ ahụ ndị ahụ na mgbo odee.</td><td>Ha juru onye nkuzi ajụjụ.</td><td></td></tr>
<tr><td></td><td><table><tr><td>Senses</td><td>ọgan</td></tr><tr><td>Ihu ụzọ</td><td>Anya</td></tr><tr><td>ihụ ihe</td><td>Ntị</td></tr><tr><td>ịnụ isi</td><td>Imi</td></tr><tr><td>Ima ka Ihe is atọ</td><td>Ire</td></tr><tr><td>ịma mgbe Ihe meturu gị</td><td>akpụkpọ ahụ mmadụ</td></tr></table>
Ọ kọwara ha ihe ndị a dị n’ elu ma gwa ha na akụkụ ahụ ndị ahụ na-enyeaka ka anyị mara ihe na-eme na gburu gburu anyi. Ha na-enyere anyi aka ka anyị gbanahu ọdachi.</td><td>Ihe ụmụ akwụkwọ na-eme.
Ụmụ akwụkwọ nwere mmasị n’ ihe onyenkuzi na-akọwa. Ha na-ele ya anya na ege kwa ya ntị n’ ihe ọ na-akọwara ha. Ha zara ajụjụ onyenkuzi ma jụkwa onyenkuzi ajụjụ dị iche iche.</td><td></td></tr>
<tr><td>Anya</td><td>Onyenkuzi ga-ese anya ma kọwaa akụkụ ime anya. Ọ kọwara ka ihe sị aba n’ anya wee ruo n’ ụbụrụ isi, anyị wee hụ ihe.</td><td></td><td>mkpalịta uka na ikwughari ihe o kwurụ.</td></tr>
<tr><td>Nsogbu anya</td><td>Onyenkuzi ji eserese kọwara ha nsogba anya atọ gbara ọkpụrụkpụ anya na-enwekarị. Ahụghị ihe nọ ebe dị anya. Ahụghị ihe nọ nso. Ọ ga-eji eserese kọwaa otu a ga-eji ugegbe anya kwesili ekwesi gwụọ ọria anya. Ọ kọkwara ọria anya ndị ọzọ di iche iche dị ka isi ọcha na isi ọji na ihe na-akpata ha.</td><td>Ụmụ akwụkwọ gere nti ma zaa ajụjụ ụfọdụ.

Ha jụrụ ajụjụ.

Ha tinyere atụmatụ nke ha n’ ihe na-akpata ikpu isi.</td><td>nkọwa, mmugharị.

Ima atụ dị iche iche.

Nkọwa.</td></tr>
<tr><td>Nlekọta anya</td><td>Onyenkuzi gwara ụmụ akwụkwọ ka ha kọwaa otu e si elekọta anya.</td><td></td><td>Mgbanwe otu e si akuzi.</td></tr>
</table>

Lessin nootu maka ihe ọmụmụ sayensi
Ihe ọmụmụ: Sayensi
Klasị: Ndị kọleji nke mbụ
Afọ : Afọ iri na atọ
Ụbọchị : 01/11/2010
Isiokwu: Akụkụ ahụ nke e ji anụ isi na nke e ji amata ụtọ ihe – Imi na ire.
Ebumnuche kpomkwem : Na ngwụcha ihe ọmụmụ a, ụmụ akwụkwọ ga:

(a) Akọwaputa ihe na –esite n' imi ziga ozi n' ụbụrụ isi.
(b) Ha ga-akọwapụta ka akụkụ ire dị iche iche si atọ
(c) Were eserese gosipụta akụkụ ahụ ire di iche iche nke esi amata ka ihe si atọ.

Ihe umuaka mabu : Ụmụaka amụọla ihe gbasara anya dị ka akụkụ ahụ e ji ahụ ụzọ.

Nnwale n'ihe ụmụaka mabụ : Onyenkuzi ga-aju ụmụakwụkwọ ajụjụ n' ihe omume O nyere ha na lesin nke gara aga di ka kedu ihe i ji ahụ ụmụ ihe perempe nke ukwu-ugegbe anya na-eme ka ihe perempe buo ibu karia, ka ha na mbụ. Ọ ga ajụ ha kwuo ihe na-eme mgbe ha nọ nsoi ebe anụ rere ere nke ha enweghị ike ihụ. Kedu ka ha si mara na anụ ahụ rere ere?

Ngwa Nkuzi : Oroma achaghi acha, unu bekee, unu nri, oko oko osisi na-esi isi ọma, mmiri ọgwụ na-enu inu.

Usoro nkuzi:

Usoro nkuzi	Ihe onye nkuzi na-eme	Ihe ụmụ akwụkwọ na-eme	Uzoro nkuzi
Mmalite Nkuzi	Onyenkuzi bata n' ime klasi ma gbaa ihe na –esi isi ọma. Ọ gwara ụmụakwụkwọ ka ha kuo ume ma kedekwa ume.	Ụmụ akwụkwọ kubara ume ma kupụtakwa ume.	Ikpalite mmụọ ụmụaka. Ọmụma atụ Mgbenwe uzoro nkuzi, ihe ngosi. Ajụjụ.
Imi	Onyenkuzi ga –agwa ụmụaka na imi bụ akụkụ ahụ mmadụ e ji anụ isi. Imi nwere oghere abụọ nke ikuku si na ha apụta. Ọ ga-agwa ha meta ịmi ha aka. Ọ ga-akọwa ihe ndi ahụ si n' imi apụta ma kọwaa ọrụ ha. Ọ ga-akọwa ka esi eji ya anụ isi. Ọ ga-akọwa maka obere akwara nke gara n' ụbụrụ isi.	Ụmụ akwụkwọ meturu imi ha aka. Ha chọputara ihe di ka mmiri. Ha gere Onyenkuzi ntị ma jụọ ajụjụ dị iche iche.	Ajụjụ
Nlekọta imi	Onyenkuzi jụrụ ụmụaka kọwaa otu esi elekọta imi. Ọ kọwapụtara ihe di iche iche .	Ụmụaka kọwara otu esi elekọta imi.	Ajụjụ.
Ire	Onyenkuzi ga-agwa ụmụakwụkwọ na ire na-eme ka anyị mara otu ihe si atọ ụtọ. Ọ ga-ajụ ha ajụjụ ndị a: (a) Meghe onu gi nke ọma ma lee anya n' enyo. Were mkpisi aka gi di ọcha tụkwasị n' elu ire. Kedu ihe i hụrụ na ihe i chọpụtara? Onyenkuzi ga-eji ihe kpuchie ha anya ma si ha chọpụta ụfọdụ ihe site ka ha si atọ.-Unere, yabasi, nnu nri, nnu oyibo na ndị ọzọ.	Ụmụ akwụkwọ ga-ekiri ma metu ire ha aka n' enyo. Ha ga-emetu akụkụ ire dị iche iche na-egosi ka ihe si atọ site n' imetu ha aka, Ụmụaka ga-esi ka ihe ndi ahu si atọ chọpụta ihe ha bụ.	Ihe ngosi. Ihe ngosi.
Nlekota ire	Onye nkuzi ga-agwa ụmụakwụkwọ kọwa otu esi elekọta ire.	Ụmụakwụkwọ kọwara otu e si elekota ire. Ụmụ akwụkwọ ga-aza ajụju onye nkuzi.	Ajụjụ.
Nwale	Onyenkuzi ga-agwa ụmụakwụkwọ kwuo ụmụ akwara ahụ nke na-eziga ozi site n' imi gaa n'ụbụrụ isi.Onyenkuzi ga-agwa ụmụ akwụwọ tinye ụfọdụ ihe dị mmiri mmiri ma mata akụkụ ire nke na-egosi ka ha si atọ ụtọ ma site n' ihe ha chọpụtara see ire.	Ha tinyere ihe ndị a n' ọnụ ma chọputa ka ha si atọ, ma akụkụ ire na-egosi ụtọ ha wee see ire.	Mmechi.

Nchikota : Onyenkuzi ga-edepụta ihe dị mkpa na mgbo odee nke ụmụaka ga-ede n' akwụkwọ ha.

Nnwale : Onyenkuzi ga-asị ụmụakwụkwọ see ire ma gọsipụta akụkụ ya di iche iche na-egosi ka ihe si atọ.

Nkwado Nkuzi maka ihe ọmụmụ sayensi

Klasị : Koleji nke mbụ

Afọ : Afọ iri na atọ
Ụbọchi : 8/11/10
Oge : Nkeji iri anọ
Isiokwu : Akụkụ ahụ eji anụ ihe na inozi nke ọma- Nti.
Ebumnuche kpomkwem : Na ngwụcha ihe ọmụmụ a, Umụ akwukwọ ga:
(a) Akọwa ka ụda si abata n' akụkụ nti nke a na-eme ka anyi nụ ụda
(b) Kpọpụta akụkụ ntị nke na-eme ka mmadụ kwudosie ike
(Ch) Gụpụta ka e si elekọta nti anya.
Ihe ụmụaka mabụ : ụmụakwụkwo amụola ihe gasara ire na imi.
Nnwale n'ihe ha mabụ : Onyenkuzi ga-ajụ ụmụaka ajụjụ ndi a:
(a) Kedu akụkụ ahụ mmadụ na-eme ka anyi mata otu ihe si atọ.?
(b) Kedu akụkụ imi nke na eziga ozi site n' imi gaa n'ụbụrụ isi?
Ngwa nkuzi : Igwe na-ekwu okwu, eserese na-egosi ka ime ntị di, na ọja.
Usoro nkuzi:

Usoro nkuzi	Ihe onye nkuzi na-eme	Ihe ụmụ akwụkwọ na-eme	Uzọ nkuzi
Mmalite Nkuzi	Onyenkuzi ga-afụrụ ọja bata klasi.	Ụmụakwụkwọ ga-ewe mmasi n' ihe Onyenkuzị na-eme, ma jụọ ya ajụjụ.	Mkpalite mmụọ.
Nti	Onyenkuzi ga –agwa Ụmụakwụkwọ na nti na-eme ka anyi nụ ihe na ikwudo nke ọma. Ọ ga-ese ntị na mgbo odee ma were ya kuziere ha akụkụ nti nke a na-ahụ anya pụtara ihe, etiti nti na ime nti. Ọ ga-egosikwa ọrụ dị iche iche ha na-arụgasị.	Ụmuaka ga-ege ntị ma depụta ihe Onyenkuzi kwuru dị mkpa. Ụmụaka ga-ajụ ajụjụ ebe ọbụla ọ di mkpa.	nkọwa, mgbanwo usoro nkuzi.
Nnozi nkọma	Ọ ga-akọwa ka akụkụ ahụ ntị nke na-eme ka mmadụ nozie nkeọma si arụ ọrụ ya	Ha ga-ege nti ma de ihe di mkpa Oynenkuzi na-ekwu.	nkọkwa. Ajụjụ, Ihe ngosi.
Kedu ka anyi si anụ ihe?	Onyenkuzi ga-ekpuchi otu nwata akwụkwọ anya ma dota igwe na-ekwụ okwụ n' akụkụ klasi di iche iche ma gwaa nwata ahụ ka o bute igwe ahụ na-ekwu okwu. Onyenkuzi ga-akọwa ka ụda si n' akụkụ nti pụtara ihe si banye n' ụbụrụ isi.	Ha ga-ege nti ma dee ihe di mkpa Onye nkuzi na-ekwu. Nwa akwụkwọ ahụ ga-ebute igwe na-ekwu okwu site n' ebe ụda ya dị. Ha ga-ajụ Onyenkuzi ajụjụ dị iche iche.	
Nlekota nti	Onyenkuzi na ụmụaka ga-akpaṛịta ụka ghasara ụzọ esi elekọka ntị anya nke ọma.	Ụmụ akwukwọ ga-enyeaka kọwapụta otu e si elekọta ntị anya nke ọma.	Mkpalita ụka.
Nnwale	Onyenkuzi ga -ajụ ụmụ akwụkwọ ajụjụ ndị a: (a) Kedu ka ụda si n' akụkụ ahụ ntị nke a na-ahụ anya si abanye n' ụbụrụ nke na-eme ka anyị nụ ihe? (b) Kedu akụkụ ahụ nti na-eme ka anyị nozie nkeọma? (ch) Depụta otụ esi elekọta ntị anya.	Ụmụaka ga-aza ajụjụ Onyenkuzi.	Mmechi.
nchịkọta	Nlekọta anya Onyenkuzi ga-achikọta ihe niile o kuziri ma depụta ha n' ụzọ di nke nke na mgbo odee.		
Ihe omume	Ọ ga-asị ụmụ akwụkwọ chọpụta ngwa na-enyere anyi aka ịhụ ihe perempe nke ukwu.		

Nchịkọta Nkuzi
Onyenkuzi ga-achịkọta ihe niile ọ kụziri ma kwe ka ụmụaka see nti. Ọ ga-edtu ụfọdụ ihe dị mkpa na mgbo odee ka ụmụaka debanye ha n' ime akwụkwọ ha.

Lessin nootu maka ihe ọmụmụ sayensi
Klasi : Koleji nke mbụ
Afọ : Afọ iri na atọ
Ụbọchi : 15/11/2010
Oge : Nkeji iri anọ
Isiokwu : Akpukpọ ahụ mmadu.
Ebumnuche kpọmkwem : Na ngwụcha ihe ọmụmụ a, ụmụakwụkwọ ga:
(a) Agụpụta akụkụ akpụkpọ ahụ dị iche iche na ọrụ di iche iche ha na arụ.
(b) edepụta ụzọ dị iche iche e si elekọta akpụkpọ ahụ mmadu.
Ihe ụmụaka mabụ : Ụmụakwụkwọ amụọla maka ire, nti na imi.
Nwale n' ihe ụmụaka mabụ : Onyenkuzi ga-ajụ ụmụaka ajụjụ ndia: kedu ka ọsụsọ si atọ? Kedu ka nri rere ọkụ si esi? Kedu mgbe mmadụ ji eji akụrụngwa eji anụ ihe? Mgbe Oyi na-atụ gi, kedu ka ọ si emetute gị n' akpụkpọ ahụ gị na imi gị?
Ngwa nkuzi : ncha dị iche iche, mmanụ otite (ude) di iche iche, eserese nke na-egosi akpụkpọ ahụ.
Usoro nkuzi:
Nchikota: Onyenkuzi ga-edetu ihe niile di mkpa na mgbe odee ka ụmụakwụkwọ denye ha n' akwụkwọ ha.
Ihe omume: Onyenkuzi ga-agwa ha lebaa anya n' ajị dị ha n' isi mgbe Oyi na-atụ ha maọbụ mgbe okpomọkụ na-ekpo ha.

Usoro nkuzi	Ihe onye nkuzi na-eme	Ihe ụmụ akwụkwọ na-eme	Uzọ nkuzi
Mmalite Nkuzi	Onyenkuzi ga-abata na klasị jiri ncha dị iche iche na ude dị iche iche	Ụmụaka nwere mmasị n'ihi ndị ahụ Onyenkuzi ji bata ma detuo ha n' ime akwụkwọ ha.	Mkpalite mmụọ
Otu akpụkpọ achụ dị	Onyenkuzi ga-ese akpụkpọ achụ na mgbo odee ma kọwara ha ya nke ọma. Onyenkuzi ga-akọwa ka akpụkpọ ahụ si na-enyeaka mgbe Oyi na-atụ na mgbe okpumọkụ di. Akpụkpọ ahụ na-egosi mgbe emetụrụ mmadụ aka na mgbe ihe ụfụ mere mmadụ. Onyenkuzi ji eserese ahụ kọwapụta ha ngalaba dị iche iche n' akpụkpọ ahụ ma kọwakwa ọrụ ha dị iche iche.	Ụmụaka gere ntị n'ihe Onyenkuzi na-ekwu, ma jụọ ya ajụjụ.	nkọwa, Ajụjụ.
Nlekọta akpụkpọ ahụ	Onyenkuzi ga-enyere ụmụaka aka gụpụta ụzọ dị iche iche esi elekọta akpụkpọ ahụ anya. Ọ ga-egosi ha ncha dị iche iche na ude dị iche iche e ji elekọta akpụkpọ ahụ anya.	Ụmụakwụkwọ ga-edepụta ụzọ dị iche iche esi elekọta akpụkpọ ahụ anya.	Mgbanwe, usoro nkuzi.
Nnwale	Onyenkuzi ga-ajụ ụmụaka ajụjụ ndi a: (a) Gụpụta akụkụ akpụkpọ ahụ na ọrụ ha na-arụ (b) Kedu ka i si elekọta akpụkpọ ahụ mmadụ anya.?	Ụmụaka ga-aza ajụjụ Onyenkuzi jụrụ ha.	Mmechi.

APPENDIX iii
INTEGRATED SCIENCE ACHIEVEMENT TEST (ISAT)
1. Which part of the eyes allows the light to come in?
(a) Conjunctiva (b) Retina (c) Cornea (d) Pupil
2. What focuses the light rays to fall on the retina.
(a) Pupils (b) Retina (c) Optic nerve (d) Lens.
3. The lens that is used to correct the short sight is:
(a) Concave lens (b) convex lens (c) short lens (d) long lens.

4. What is the name of the watery liquid that fill the front of the lens. (a) Choroid (b) vitreous humour (c) Aqueous humour (d) Ciliary body.
5. In short sight, which of the following statement is true. (a) The eyeball is too long. (b) The images of distant objects focus in front of the retina. (c) It can be corrected using the concave lens. (d) The images of nearby objects focus behind the retina.
6. Which part of the eye controls the amount of light coming into the eye? (a) lens (b) cornea (c) Iris (d) pupils
7. Which is not true about the schera?
(a) Controls the amount of light entering the eye.
(b) Protects the inner structures of the eye.
(c) Maintains shape of the eyeball.
(d) Helps in the attachment of the eye muscles.
8. The following are eye defects except:
(a) Short-sightedness (b) accommodation
(c) long sightedness (d) astigmatism
9. The wall of the eyeball consists of these layers except:
(a) sclera (b) choroids (c) retina (d) cornea
10 What is another name for short-sight?
(a) astigmatism (b) hypermetropia (c) myopia
(d) binocular
11 Which part of the ear is responsible for the maintenance of balance? (a) ossicles (b) perilymph (c) cochlea
(d) semicircular canals.
12. The outer ear is called: (a) cochlea, (b) pinna (c) ear canal
(d) stapes
13. The main function of the ear are these except to:
(a) direct sound waves (b) detect sound waves
(c) maintain our balances (d) hear sound waves
14 Of all the functions of the semicircular canals one of these is not correct:
(a) stimulate impulses and send them to the brain.
(b) Transmits vibrations to endolymph.
(c) transmits vibrations to the ear ossicles.
(d) causes the hairs of sensory cells to bend.
15. The main function of the cochlea is to:
(a) transmits vibrations to the pinna.
(b) Directs sound waves to the oval window.
(c) transmits sensory impulses to the middle ear.
(d) transmits impulses to the brain.
16. The ear ossicles are except:
(a) Eustachian tube (b) incus (c) stapes (d) malleas
17 The nerve responsible for sending impulse to the brain from the ear is: (a) optic nerve (b) auditory nerve (c) perilymph nerve
(e) endolymph nerve.
18 The nose is made up of two----------which opens to the outside. (a) cerebrums (b) olfactory (c) Mucus
(d) nostrils.
19. Functions of the nose are:
(a) breathing and moist (b) respiration and smelling
(c) taste and breathing (d) respiration and breathing.
20 The nose nerve carry information to the brain but one of these is not among.
(a) the smell of burnt food (b) leaking gas (c) smell of scent
(d) smell of water.
21 Another name for taste buds is:
(a) taste pore (b) epithelium (c) papillae (d) bitter bud.

22 One of these is not a taste that can be dictated by the tongue:
(a) pressure (b) sour (c) bitter (d) sweet.
23 Many small projections on the upper surface of the tongue are:
(a) taste pores (b) taste buds (c) taste hair (d) taste nerves.
24 The taste at the side of our tongue is
(a) sour (b) bitter (c) sweet (d) salt .
25 The main function of the ear is all but one of these:
(a) hearing (b) balance (c) keep away from danger
(d) keep sound waves.
26 With our skin we have sensations but one of these
(a) touch, (b) pain (c) taste (d) cold.
27 The aim of oiling the skin regularly is to :
(a) remove dirt (b) reduce soap (c) remove dryness
(d) remove odour.
28 One can take care of the skin through but one of these:
(a) eat a balanced diet.
(b) keep away from the sun.
(c) do a lot of exercise.
(d) take fresh air.
29 Some people have pimples on their face because they :
a) inherited it (b) do not wash their skin well
c) do not oil the skin (d) they sweat always.
29. Body odour is as a result of :
a) sweat (b) improper washing (c) unhealthy living
d) action of bacteria.
30 We do not have:
(a) two eyes (b) two nostrils (c) two ears
(d) two tongues.

ANSWERS

1. c
2. d
3. a
4. c
5. d
6. a
7. b
8. d
9. c
10. d
11. b
12. a
13. c
14. d
15. a
16. b
17. d
18. b
19. d
20. c
21. a
22. b
23. b
24. a