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PART 1: QUESTIONS ABOUT SCIENCE

Question 1: The Chemical Compound that is responsible for global warming is...

Choices

NH ₃	O ₂	N ₂	CO ₂
1	2	3	4

V2:8

Question 2: The weathering of concrete structures exposed to rain may be as a result of water combining with...

Choices

NH ₃	SO ₂	CH ₄	Fe
1	2	3	4

V3:9

Question 3: The chemical substance that protects the earth from harmful ultra violet rays...

Choices

CO	CO ₂	O ₂	O ₃
1	2	3	4

V4:10

Question 4: Seasonal change on earth is caused by...

Choices

The rotation of the earth	The position of the earth relative to the sun	The tilt of the earth	The position of the earth relative to other planets
1	2	3	4

V5:11

Question 5: While making your way to a lecture, three objects, a pen, an eraser and a coin, fall out of your pocket at the same time. As you watch them fall you notice...

Choices

The pen falls fastest	The eraser falls fastest	The coin falls fastest	All objects fall together
1	2	3	4

V6:12

Question 6: When ice melts in a container of water, the water level decreases because...

Choices

Ice is equally dense as water	ice is more dense than water	ice is less dense than water	the statement is untrue
1	2	3	4

V7:13



Question 7: When you are seated in a car and it swerves to the left, your body moves to the right because your body wants to...

Choices

stop moving	move to the left	move to the right	keep on going in a straight line
1	2	3	4

V8:14

Question 8: It is easier to pull than to push an object because the net force exerted by the ground...

Choices

Increases	Decreases	remains constant	the statement is untrue
1	2	3	4

V9:15

Question 9: When catching a cricket ball, the pain experienced by the hand can be reduced if the time taken to stop the ball...

Choices

Increases	Decreases	remains constant	the statement is untrue
1	2	3	4

V10:16

Question 10: When salt is added to a cooking vessel, the boiling point of its contents...

Choices

Doubles	Decreases	remains constant	increases
1	2	3	4

V11:17

Question 11: The by-products of cellular respiration are...

Choices

O ₂	CO ₂	CO ₂ and energy	Energy only
1	2	3	4

V12:18



Question 12: The genetic make up of an offspring is...

Choices

predetermined in the mother	predetermined in the father	dependent on the crossing over of chromosomes	dependent on the time of fertilization
1	2	3	4

V13:19

Question 13: A synthetic product can be described as a strong acid if its pH is...

Choices

6	7	14	1
1	2	3	4

V14:20

Question 14: Chemical reactions in the body are influenced by enzymes as the rate of reactions...

Choices

Double	decrease	remain constant	increase
1	2	3	4

V15:21

Question 15: The AIDS virus is transmitted during...

Choices

Saliva exchange if there are abrasions in the oral cavity	Sexual intercourse	Intravenous blood transfusion	All of the above
1	2	3	4

V16:22

Question 16: The unit in which electricity is bought from power suppliers is ...

Choices

Kg	W	Cd	kWh
1	2	3	4

V17:23

Question 17: The energy changes which take place when a light is switched on

Choices

electrical to heat	electrical to light	electrical to heat to light	heat to light
1	2	3	4

V18:24

Question 18: The best conductor of electricity is...

Choices

Cu	Ag	Fe	Au
1	2	3	4

V19:25

Question 19: Which one of the following properties determines the colour of light?

Choices

Wavelength	frequency	speed	velocity
1	2	3	4

V20:26

Question 20: A ball is dropped from a height above the ground, it falls and bounces back to ...

Choices

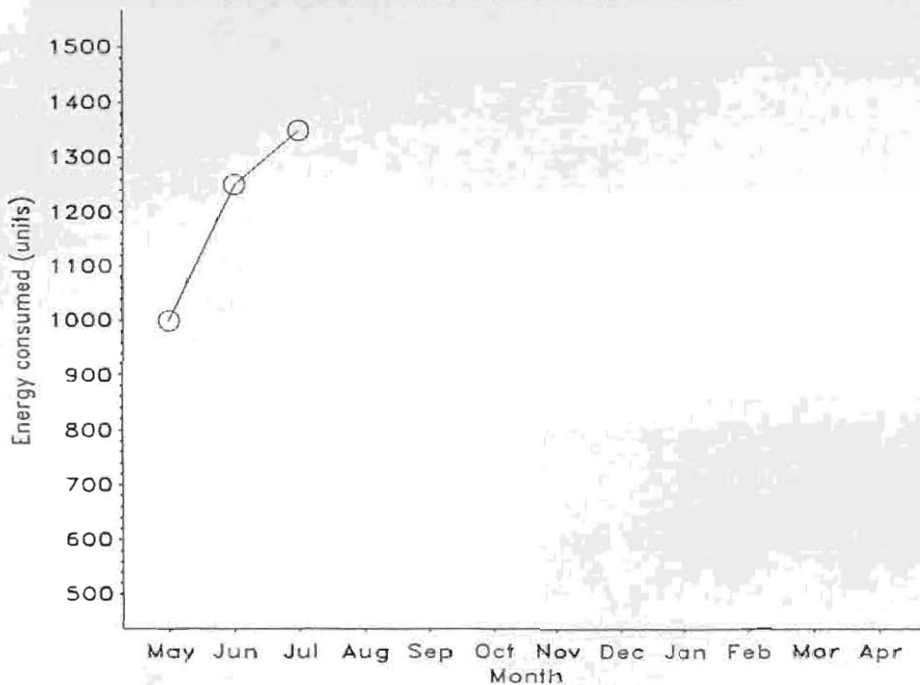
The original height	< the original height	> the original height	the original height repeatedly
1	2	3	4

V21:27

PART 2: QUESTIONS ABOUT SCIENCE IN OUR EVERYDAY LIVES

Task 1: The graph below reflects electricity consumption for a family of four in a standard three-bedroom home in Gauteng for a three month period. Sketch changes to the shape of the graph for the period December to February. Support your proposed changes with valid reasons.

Graph of Electricity consumption per month

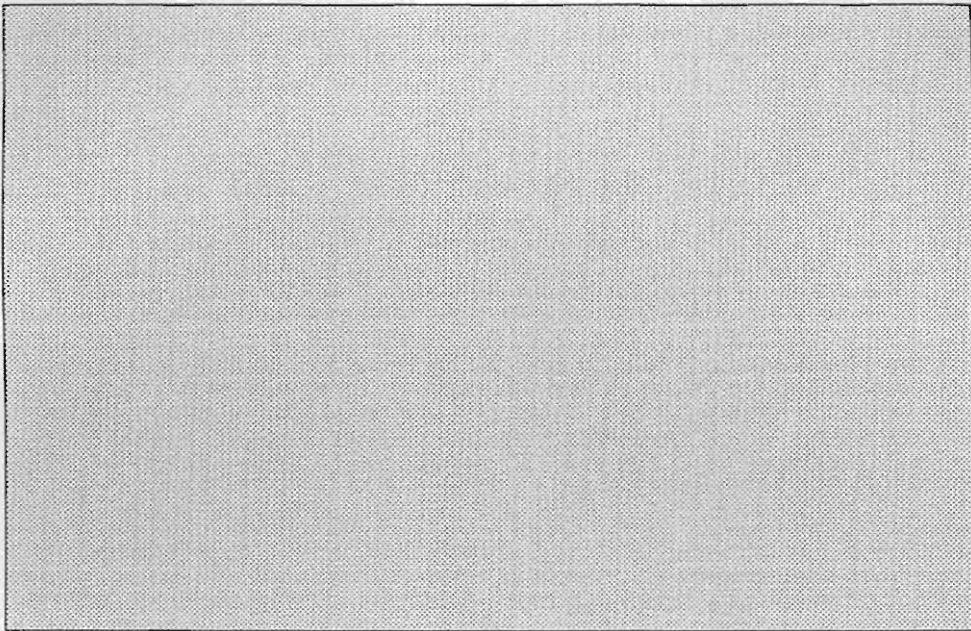


<input type="checkbox"/>	<input type="checkbox"/>	V22:28-29
<input type="checkbox"/>	<input type="checkbox"/>	V23:30

<input type="checkbox"/>	<input type="checkbox"/>	V24:31-32
<input type="checkbox"/>	<input type="checkbox"/>	V25:33

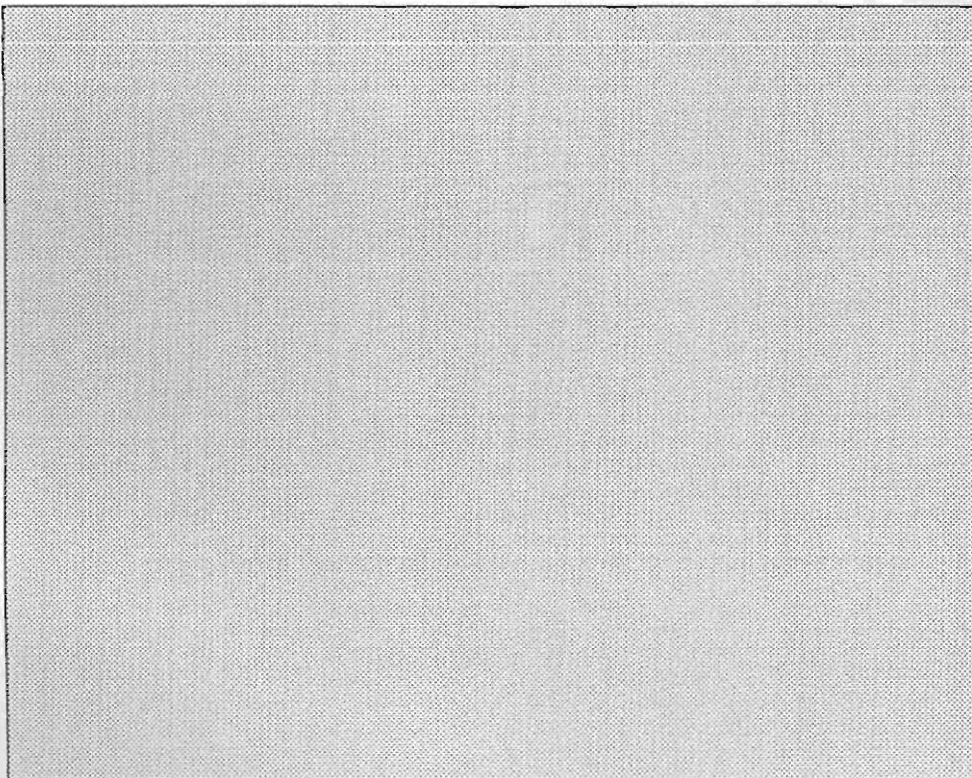
Provide reasons for changes to the shape of the graph:

Task 2: Briefly describe the technological factors that you would take into consideration before purchasing a cell phone, and justify your selection of factors?



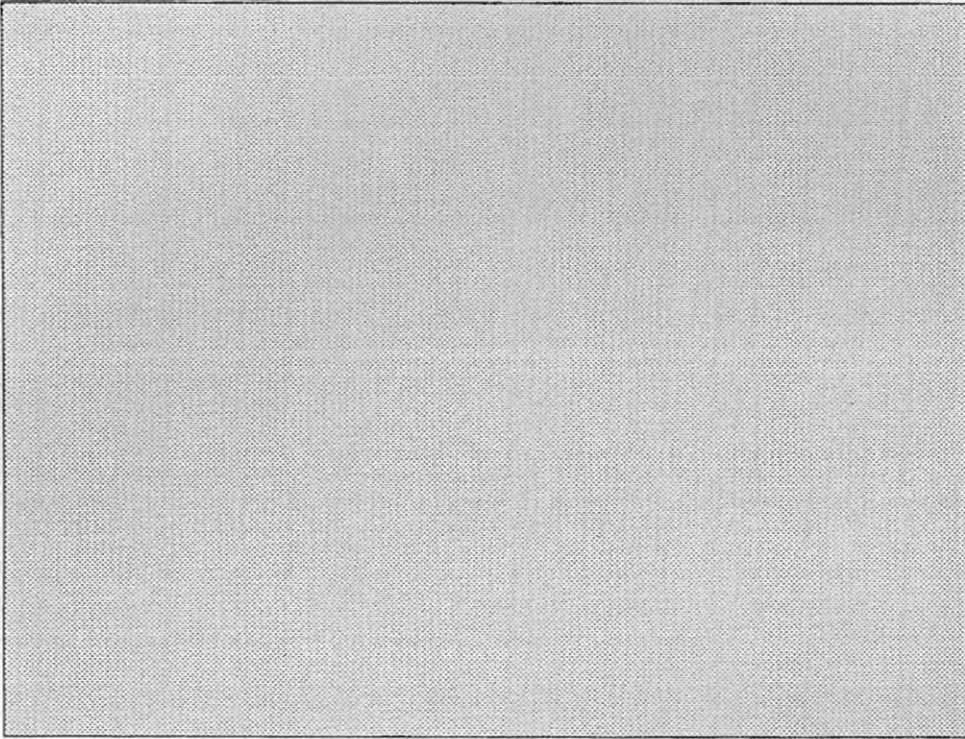
		V26:34-35
		V27:36

Task 3: Discuss the impact of the internet on society:



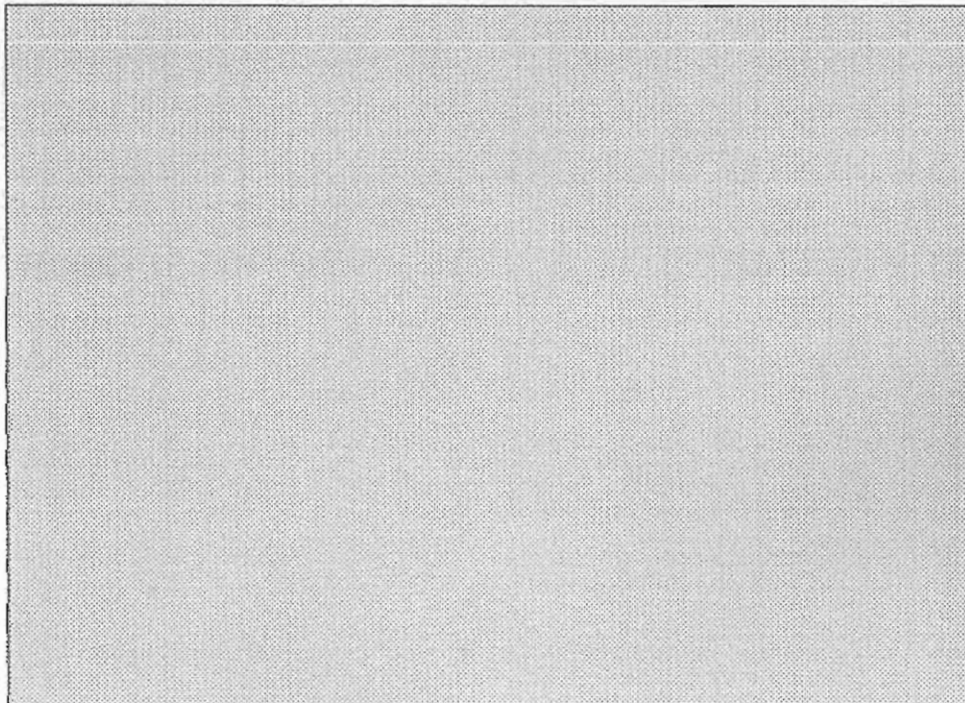
		V28:37-38
		V29:39

Task 4: Should the drug AZT be made available to pregnant women in South Africa?



		V30:40-41
		V31:42

Task 5: Provide an illustrated example of an indigenous (home-grown) form of technology that you have experienced in South Africa.



		V32:43-44
		V33:45

Task 6.

Suppose that the U... d to embark on an active campaign of community service and enlisted the support of its students. You have been requested to assist with resolving sanitation problems at an informal settlement for a population of 100 residents. You have the daunting task of applying your knowledge and understanding of sanitation issues to develop a system that is cost effective and convince the local community that the system that you develop is in their best interest. Prepare a detailed description of how you would approach this challenge. Your response should be restricted to a page and include details on:

Investigations Pursued:

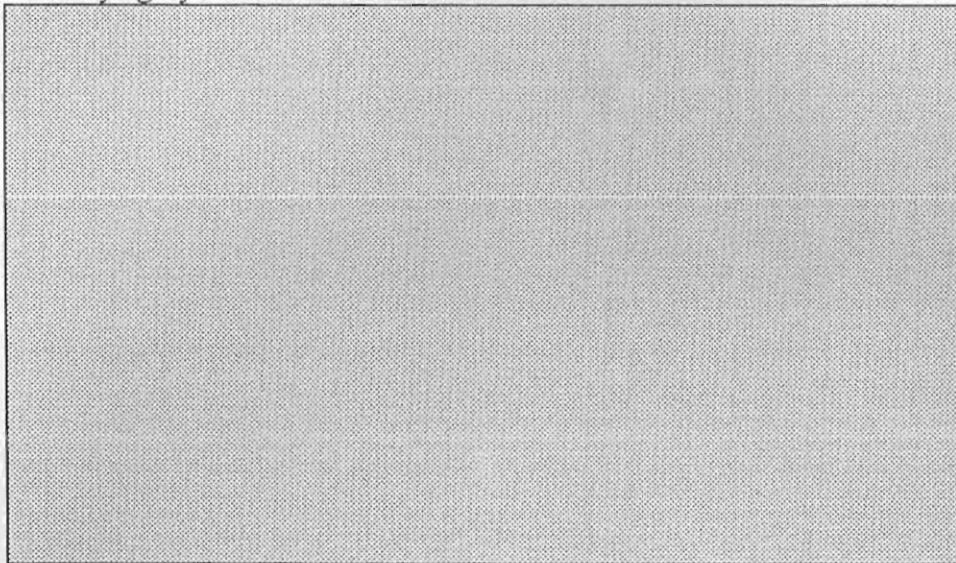
		V34:46-47
		V35:48-49
		V36:50-51
		V37:52-53
		V38:54

Design and Planning:

		V39:55-56
		V40:57-58
		V41:59-60
		V42:61-62
		V43:63

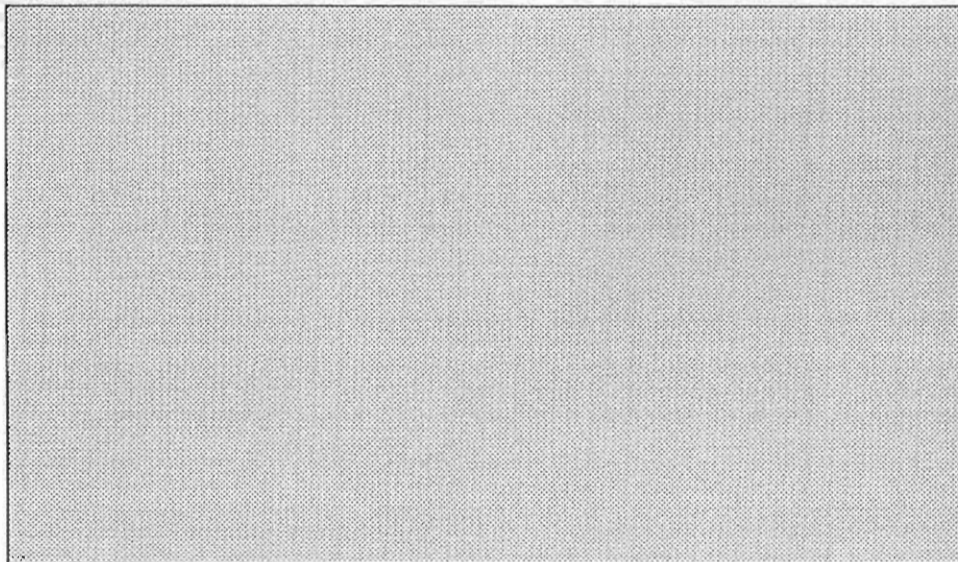


Modifying Systems to Suit Contexts:



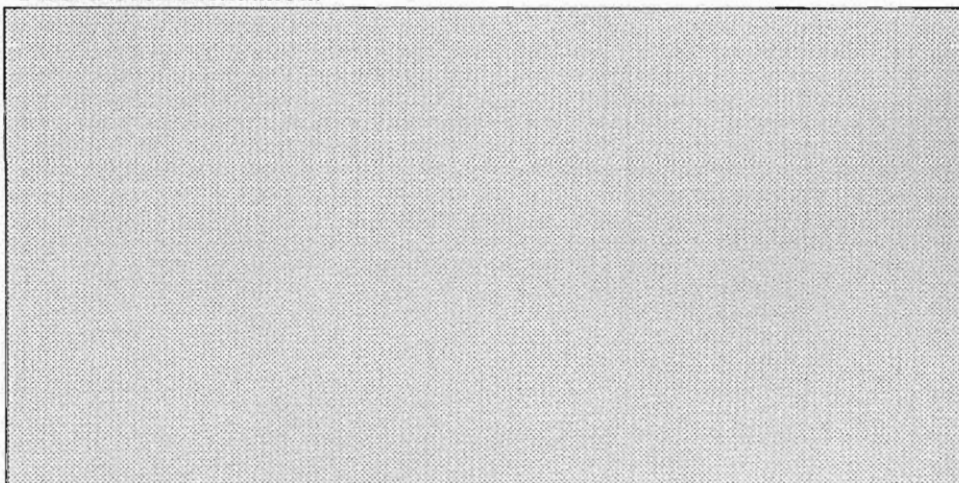
		V44:64-65
		V45:66-67
		V46:68-69
		V47:70-71
		V48:72

Sensitivity to the Issues and Choices in the Community of Informal Settlers:



		V49:73-74
		V50:75-76
		V51:77-78
		V52:79-80
		V53:81

Final Recommendation:



		V54:82-83
		V55:84

PART 3: QUESTIONS ABOUT YOU:

1. What is your name?

2. What is your age in completed years?

V56:85

3. What is your gender?

Male 1 Female 2

V57:86

4. What is your first language (the language you use most often)?

English	1
IsiZulu	2
SeSotho	3
IsiXhosa	4
Afrikaans	5
Setswana	6
Other (specify)	
<input type="text"/>	

V58:87

5. Are you willing to be interviewed for this study?

Yes 1 No 2

V59:88

If "Yes", please provide a contact number below.

6. Name the last school that you attended?

V60:89

7. Where is the school located e.g. Diepkloof?

V61:90



8. In which province is your school situated?

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		V62:91
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9. How would you describe the area in which your school is situated?

City	1
Suburb	2
Township	3
Farm	4
Other (specify)	

		V63:92
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10. Select the former department that your school was affiliated to?

DET (Urban African Schools)	1
HOD (Indian Schools)	2
HOR (Coloured Schools)	3
DEC (Homeland African Schools)	4
HOA (White Schools)	5
Other (specify)	

		V64:93
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11. Describe the physical resources of your school using the table below?

Physical resource	Excellent	Good	Poor	Not available
Electricity	1	2	3	4
Laboratories	1	2	3	4
Text book supply	1	2	3	4
Teaching aids (charts etc)	1	2	3	4
Furniture (desks & chairs)	1	2	3	4

	V65:94
	V66:95
	V67:96
	V68:97
	V69:98

12. Complete the following table for subjects taken in matric?

Subject	High	Std	Lower	Symbol
English	1	2	3	
Physics	1	2	3	
Mathematics	1	2	3	
Biology	1	2	3	
Geography	1	2	3	
Other subjects (specify)				
a.	1	2	3	
b.	1	2	3	
c.	1	2	3	
d.	1	2	3	

		V70:99
		V71:100
		V72:101
		V73:102
		V74:103

V75-V86
104-107
108-111
112-115
116-119

13. How many learners were in your matric science class?

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		V87:120
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14. What was the medium of instruction in your matric science class at school?

English only	1
English & your 1 st language	2
Your 1 st language only	3
Other (specify)	

	V88:121
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15. Indicate how often you experienced each of the following kinds of teaching in science at matric level?

Kind of teaching	Always	Most times	A few times	Never
Mainly chalk and talk	1	2	3	4
Use of textbooks to explain	1	2	3	4
Questions and answers	1	2	3	4
Problem solving	1	2	3	4
Science experiments	1	2	3	4
Work in small groups	1	2	3	4
Other(specify)				
	1	2	3	4

	V89:122
	V90:123
	V91:124
	V92:125
	V93:126
	V94:127
	V95-V96

			128-129
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16. To what extent were each of the following learning methods encouraged in science classes at school?

Learning Method	Always	Most times	A few times	Never
Memorize notes & equations	1	2	3	4
Solve problems using numbers only	1	2	3	4
Solve problems using concepts and principles	1	2	3	4
Solve problems using concepts and principles	1	2	3	4
Solve problems using numbers, concepts and principles	1	2	3	4
Use your own ideas to understand new information	1	2	3	4
Relate physics to real life	1	2	3	4
Other(specify)				
	1	2	3	4

V97:130

V98:131

V99:132

V100:133

V101:134

V102:135

V103-V104

136-138

17. What degree are you registered for at University?

B.Sc	1
B.Sc. Engineering	2
B. Paed	3
Other (specify)	

V105:139



18. Select the subjects (course

Course	Taken this year	Taken last year
Physics 1	1	2
Chemistry 1	1	2
Mathematics 1	1	2
Biology 1	1	2
Applied mathematics 1	1	2
Computer science 1	1	2
Engineering drawing	1	2
Geography	1	2
Other (specify)		
a.	1	2
b.	1	2
c.	1	2
d.	1	2
e.	1	2

				V106/107:140-141
				V108/109:142-143
				V110/111:144-145
				V112/113:146-147
				V114/115:148-149
				V116/117:150-151
				V118/119:152-153
				V120/121:154-155
				V122-V136
				156-159
				160-163
				164-167
				168-171
				172-173

Thank you for responding to the questions posed above. You will be briefed about the findings distilled during the synthesis of data. If you are unhappy with any aspect of the work, it will be revisited as you specify. I once again wish to remind you that all information retrieved from the questionnaire will be treated in the strictest confidence.



Focus Group Interview Schedule

Instructions:

- a. Quickly decide how the following roles will be assigned in your group of five students:
Gatekeeper: ensures that each member has an equal opportunity to participate.
Scribe: summarizes the main points raised in the discussions.
(Rotate these roles for each of the questions provided below.)
- b. Discuss each of the questions listed below in your groups and provide responses in the spaces provided. There could be more than one response per question if the group decides that more than one answer is correct.
- c. Circle the correct answers in the table below before attempting the questions:

Group No:	1	2	3	4	5
Course:	PHY101		PHY171		

QUESTIONS:

- 1. Define the following terms:
 - a) Scientific Literacy:

- b) Technological Literacy:



2. Explain how you would determine whether your friend, colleague or parent is:
a) scientifically literate:

- b) technologically literate:

3. How do you use science and technology in your everyday lives? For example, what scientific principles are applied while driving a car or when preparing meal?
N.B. PLEASE USE YOUR OWN EXAMPLES!



4. If you were the Minister of Arts, Culture, Science and Technology, what changes would you introduce in society to enable all citizens to become scientific and technological literate?

5. In the questionnaire that you completed earlier this year, you encountered several challenges. Some of these challenges included determining whether AZT should be made available to pregnant women, the technological factors taken into account when choosing a cell phone, and the impact the internet has had on society. Discuss these challenges in your group and provide a joint response to each challenge.

- a) AZT availability to pregnant women:

- b) Cell phone technological factors:

- c) Impact of the Internet on Society



Observer Schedule

Observer Name:										
Observer Registration Number:										
Group No:	1	2	3	4	5					
Course:	PHY101				PHY171					

The observer plays the most critical role in the execution of this focus group interview as s/he will objectively record the group dynamics that are associated with the development of responses to the questions in the focus group interview schedule. The observer must remain with the group that s/he has been assigned to at all times. The observer is kindly requested to complete the following frequency table during observations.

N.B. The observer will also be the Timekeeper, i.e. ensure that the same amount of time is allocated to each question.

The following key will guide the completion of the table below:

- Level of Participation:
- 1 – Poor (NO suggestions or questions per Group discussion, readily accepts group response contribution)
 - 2 – Satisfactory (1 or <1 suggestion or question per Group discussion, readily accepts group response)
 - 3 – Average (1 to 2 suggestions or questions per Group discussion, challenges group response at least once)
 - 4 – Good (3 to 4 suggestions or questions per group discussion, challenges group response 3<1 times)
 - 5 - Excellent (>4 suggestions or questions per group discussion, challenges group response >3times, leads the discussions)

- Use of Science Concepts:
- 1 – Poor knowledge of science concepts
 - 2 – Lists scientific terms without explaining them
 - 3 - Lists the scientific terms and explains them
 - 4 – Links scientific knowledge coherently
 - 5 – Talks about science at an abstract level

Use of Technological Concepts

- 1- Cannot apply scientific concepts in real life situations
- 2- Applies scientific concepts to real life situations satisfactorily
- 3- Applies scientific concepts to real life situations well
- 4- Can debate the advantages and disadvantages of technology e.g. AZT and cell phones
- 5- Can discuss the impact of technology e.g. the internet



Group member	Level of Participation					Use of Science Concepts					Use of Technological Concepts				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1															
2															
3															
4															
5															

The observer is also required to provide a description of each of the following:

a) how consensus was reached in the group,

b) the kinds of challenges encountered in each of the groups.

Appendix 3. Analysis of Focus Group Interviews

N.B. These are actual responses of the focus groups.

#	Course	# of Students	Scientific Literacy	Technological Literacy	Use of Science in Everyday Life	Enable Scientific and Technological Literacy	AZT	Cell Phone	Internet
1a	PHY 101	3	<p>Is the understanding of science and its application on a daily basis</p> <p>TEST: The way he looks at things and if the person has an enquiring mind.</p>	<p>It's the understanding of technology like electricity and its understanding by the ordinary people and also electricity</p> <p>TEST: If a person is exposed to technological appliances and knows how to use them in a daily basis.</p>	<p>We use science to measure the speed of anything which is in motion. We can use technology to communicate in everyday lives e.g. cell phones. Newton's laws of motion can be used to turn the steering wheel of a car.</p>	<p>We must give more practical examples that are applied daily and which they can understand better.</p>	<p>Yes, it must be available in order to lower the rate of babies born with HIV virus</p>	<p>More functions that are available on the cellphone, quality of the battery, the capacity of the cell to store data.</p>	<p>It has given people easy access to information.</p>
1b	PHY 101	4	<p>a process whereby information about science is given</p> <p>TEST: By asking whether they understand the concepts/scientific processes that take place in our everyday lives. E.g how does it come about to rain</p>	<p>Is a process whereby how science works in an everyday life</p> <p>TEST: Through questioning them to see whether they know how to use technological equipments (sic) like computers.</p>	<p>Putting a plug into a socket to use electricity. Switching a light on/off.</p>	<p>Educate people about how science and technology work like introducing scientific equipments (sic) to them. Encourage them to participate in scientific events.</p>	<p>If it is used to protect women and their babies during their pregnancy then it should be made available.</p>	<p>A cell phone is the easier way to communicate, if there are disadvantaged factors they would be improved.</p>	<p>No response</p>

#	Course	# of Students	Scientific Literacy	Technological Literacy	Use of Science in Everyday Life	Enable Scientific and Technological Literacy	AZT	Cell Phone	Internet
1	171	1	<p>To know the science of the earth and understand it and you can apply the laws of science.</p> <p>TEST: I would ask him why does an apple fall from a tree. If he know it is scientific he knows something scientific.</p>	<p>You can use modern technology like VCRs and computers. If the computer is broken you can sort of know what the problem is and fix it.</p> <p>TEST: It is easy to see. If he can program a VCR and know how to use a computer and try to be technological advancing everyday.</p>	<p>I program on a computer. Science is used when I am ryding my bike from home to university like taking a corner</p>	<p>I would give free internet to everyone.</p>	<p>It is their right, if they want to use it they must know the consequences.</p>	<p>If you want someone urgently you can get them easier on their cellphone</p>	<p>If you want information of everythng you can get it there and you don't have to drive to the place to get them (sic)</p>

2a	PHY 101	5	<p>The understanding of science in general e.g. reading, using equation, doing, experiment and observation and applying these in real life.</p> <p>TEST: If the person is able to figure out any problem without a solution by himself using his common sense e.g. throwing grass in the air to determine the direction of the wind.</p>	<p>The understanding of technology in general and being able to use or operate modern systems e.g. TVs, computers, etc.</p> <p>TEST: By being able to use technological devices in everyday life. Like using cellphones and manual.</p>	<p>Being cautious of electric appliances. For instance, when baking with an electric stove using right degrees.</p>	<p>I could introduce more training/technical centres where learning is more practicaly oriented</p>	<p>AZT is giving lives to many babies who could have died.</p>	<p>Encourages communication. It's faster to get a message across.</p>	<p>Safes time. More info in a short time.</p>
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2b	PHY 101	5	<p>Books, literacy, etc. that has something to do with science. It is explained in scientific terms and language. Ideas and concepts in science – what question we have and what the answers is to that question concerning science</p> <p>TEST: They must have the basic understanding about science. They must also be interested in the field of science. Take their lifestyle into consideration – what do they do, read – how do they interpret things in life. What ideas do people have</p>	<p>Literacy that has to do with new discoveries and technological advances. How things are put together and how they work and why they work. How technology is used in our everyday life.</p> <p>TEST: The person must be computer literate. They must be able to know about the latest technology. See if they use the latest technologically advanced cellphones, computers, tvs</p>	<p>Technology: Computer for e-mail, TV, cellphones.</p> <p>Scientific: When taking a photograph - (lenses) create a focal point. Electricity.</p>	<p>Provide free computer lessons. Science and technology must be introduced in Primary schools to enable the learners to have a basic understanding.</p>	<p>Yes, it should be available to all pregnant women with HIV/AIDS Because why should you have two dying persons instead of one.</p>	<p>Communication is an important factor in our lives. Look at battery time, talk time, if it can fax, e-mail, the size.</p>	<p>Persons can have more information. It is also negative because any information can be put on the Internet without supervision.</p>
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2b	PHY 171	4	<p>An understanding of general science, physics, chemistry or natural sciences etc. Basic understanding of the jargon.</p> <p>TEST: ...by listening to their explanations (of) scientific topics and also by judging them by their habits and interests.</p>	<p>Be able to use and feel comfortable with technological equipment and able to adapt to advancements thereof. And a basic understanding of the jargon.</p> <p>TEST: They are comfortable around new technology and can easily adapt and learn how to use technological equipment.</p>	<p>The use of electricity, Using computers and the Internet. The cooking of food.</p>	<p>Supply electricity to all parts of the country. Move programmes and promotions to inform and educate the citizens about how technology can impose their lives. In educating them about technology you educate them about science.</p>	<p>AZT should be available enabling the women to choose if she wants to use it.</p>	<p>SMS, internet access, large broadcast area. The battery should be able to last a long time.</p>	<p>Globalization, knowledge is more readily available Positive effect on the economy, use of e-commerce. E-mailing speeds up communication and is cheaper.</p>
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3	PHY 171	3	<p>Applying mathematical principles to the real world, towards benefit of mankind.</p> <p>TEST: They can help with your physics homework</p>	<p>Programming a VCR. Being able to use electronic appliances.</p> <p>TEST: Knowing the terminology e.g. MB = megabyte, and not act damaging towards technological appliances.</p>	<p>Most principles are instinctive (and) our subconscious (sic). We don't feel we actually benefit from our studies in physics...</p>	<p>Firstly, not group arts and science...</p>	<p>Our government believes that HIV does not cause AIDS!!! Poverty does...</p>	<p>They cause cancer due to radiation.</p>	<p>Degradation of society towards decadence</p>
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3	PHY 101	5	<p>The knowledge and understanding of scientific terminologies and theories and the application thereof.</p> <p>TEST: We would determine this by their interests, literature read, television programmes watched, basic scientific knowledge, and if they can relate to a conversation about science.</p>	<p>The awareness of Technological advances in the fields of mechanics and electronic advance, and the ability to use, apply and improve on these theories.</p> <p>TEST: Whether the person is able to use and understand basic everyday technology. How to operate a calculator, computer, cell phone, TV, microwave oven, VCR.</p>	<p>A roller coaster ride. Crossing a road – you judge the speed and distance, time, of the car approaching, if you’ll be able to cross safely.</p>	<p>Making scientific equipment available to students at primary school level by making (it) part of the curriculum. Motivating the students and encouraging them to get scientific interests at an early age by science fairs, expos, and school practicals. Make science expos appeal to people of all ages, races and financial status.</p>	<p>Yes (3) and No (2).</p> <p>Yes =having morality and compassion and the possibility of saving a child’s life.</p> <p>No = There is a high possibility that the mother will die and the child will survive, thus leaving an orphan-chain reaction.</p>	<p>...size of screen and phone, settings, battery life and accessories available.</p>	<p>The impact is great because of the availability of all the information, good and bad. Good – socializing, support groups, shopping, educational. Bad-pornography, crime, drugs and explosives and credit card fraud.</p>
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