

APPENDICES

Appendix A: Mission Pledge of Delta Environmental Centre



Our COSTS

R33.00 per learner per 3 hour programme

R17.00 per learner per 1½ hour programme

Extra costs for weekend programmes may apply

Our CONTACT DETAILS

School Programmes Coordinator
Jana Cauldwell

Physical address: Delta Park, Road no. 3, Victory Park, Johannesburg

Postal address: Private Bag X6, Parkview, 2122

Tel: (011) 888 4831
Fax: (011) 888 4106

Website: www.deltacentre.org.za
Email: delta@deltacentre.org.za

Our VALUES

Delta Environmental Centre upholds the following fundamental values as identified in the manifesto of Values, Education and Democracy issued by the Department of Education in 2001:

Democracy	Social Justice & Equity
Equality	Respect
Ubuntu (Human Dignity)	The Rule of Law
An Open Society	Reconciliation
Non-racism and	Accountability
Non-sexism	(responsibility)

Who we are...

Our VISION

Delta Environmental Centre is a private independent Section 21 Company (non-profit organisation) that aims, through innovative education & training programmes and consultation, to enable people to improve the quality of their environment by promoting the management and sustainable use of all resources, in line with the South African Constitution.

Our MISSION

- To create an awareness about environmental issues by imparting / sharing appropriate knowledge;
- To introduce new, and enhance existing participant's skills;
- To develop responsible values and attitudes to the environment; and
- To encourage participation in environmental "action" projects.

School Programmes - 2010

Environmental Education
in Action!

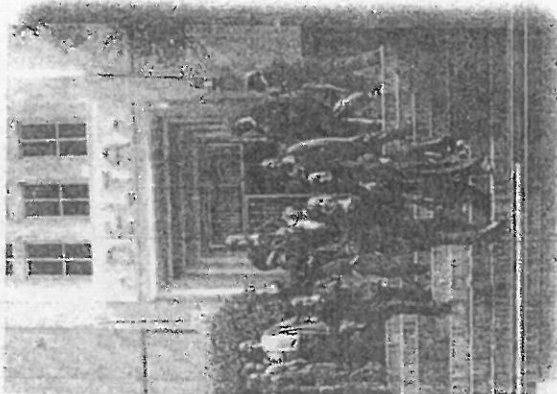
Striving for what we believe in

Special Programmes

All our programmes make extensive use of the Delta Environmental Centre as well as the Delta Park. Our programmes are designed to meet the curriculum requirements at all levels. Please talk to us about any specific needs you may have or a topic you would like to cover.



Delta Environmental Centre



Appendix B: National Curriculum Statement Work schedule

WORKSCHEDULE FOR GEOGRAPHY: GRADE 11 -2010

Assessment standards	LO 1 Geographical skills and Techniques	LO 2 Knowledge And understanding	LO 3 Application
AS 1	Plan and structure a project or enquiry process	Explain processes and associated spatial patterns in a range of places and regions	Apply skills and knowledge to a range of phenomena, issues and challenges at local and continental scales
AS 2	Acquire a variety of information from relevant primary and secondary sources which include fieldwork	Compare and contrast processes and spatial patterns between places and/or between regions	Examine the consequences of actions resulting from values and attitudes held by individuals and groups which influence processes, spatial patterns and human-environment interactions at local and continental scales
AS 3	Classify the acquired information according to different categories	Examine issues and challenges arising from human and environment interactions in a local and continental context	
AS 4	Analyse information obtained from a variety of sources including fieldwork data, 1:500000 topographical maps, orthophotos and statistics	Explain different measures of conserving the environment while addressing human needs in a variety of contexts	
AS 5	Report findings in written, oral and/or written form		

CASS ASSESSMENT TASKS

NB: Task 2-Research and task 3 – Practical task should be given in the first term (planning)
Task 1 must be completed in first term
Task 2 should be completed in the second term and task 3 should be completed in third term

Term 4 04 October to 10 Dec 11 weeks	Period	Learning Outcomes	Assessment	Activities And resources	Module	Unit	Topic/theme/Content	Assessment/ Portfolio activities	Date started	Date completed
Term 4 04 October to 10 Dec 11 weeks	Week 03 18-22 Oct	1	2	Compare and contrast information from graphs and statistics	5	2	Energy and waste management	- Increasing demand for energy - Relative and changing importance of fossil fuels, nuclear power and alternative energy sources - The environmental costs of energy provision: global warming, acid rain, deforestation, pollution, soil erosion - Causes and effects of energy production related to pollution - Causes and consequences of acid rain and the importance of international co-operation - Environmental effects of resource and energy consumption on world temperatures - Sustainable energy principles and approaches- consider new forms of energy and approaches to energy conservation		
		4	Analyse information to explain why there is an increasing demand for energy							
	2	1	Explain the patterns of energy use in Africa to the US							
	2	2	Compare and contrast energy use of above							
	2	4	Examine issues and challenges							
	3	1	Apply skill and knowledge to energy use							
	1	2	Classify energy under renewable and non-renewable energy							
	3	1	Apply skills and knowledge in own area to find causes of pollution							
	2	2	Find impacts on own area							
	1	5	Design poster to address the problems of pollution and its solutions							

Appendix C: Learners' worksheets

SECTION A THE ENERGY SCAVENGER HUNT

Venue: The Energy Room

ACTIVITY LOCATING SITES ON A MAP

Create your own symbols for the various types of power stations and use these symbols to mark their locations on the map. The first one (a Nuclear Power Station) has been done as an example.

SOUTH AFRICA & NEIGHBOURING STATES

South Africa has one Nuclear Power Station, near Cape Town

LEGEND	
Symbol	Description
☒	Nuclear Power Station (Display 1 station)
	Coal-fired Power Station (Display 5 stations)
	Gas / Liquid Fuel Power Station (Display 2 stations)
	Hydroelectric Power Station (Display 1 station)
	Pumped Storage Power Station (Display 1 station)

ACTIVITY INSULATION

Insulation can be used in many ways to cut down the loss AND cost of energy.

Compile a list from 5 examples in the Energy Room showing how insulation can be used:

1. _____
2. _____
3. _____
4. _____
5. _____

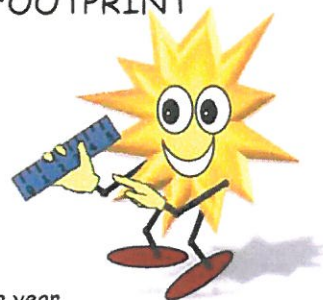
SECTION B MEASURING OUR CARBON FOOTPRINT

Venue: Car Park

DID YOU KNOW THAT

Transport is the single biggest CO₂ producing sector responsible for climate change.

An average car produces 0.3 kg of CO₂ / km



Use the steps below to help you work out who emitted the most CO₂ in a year.

Select a car in the car park (carrying details about the driver and kilometers travelled)

Calculate the amount of CO₂ that it emits per year

Step 1: Calculate the average distance (km) travelled by this car in a week _____

Step 2: Calculate the distance travelled per year _____

(km x 52 weeks = km travelled in a year)

Step 3: Multiply the yearly kilometers by 0.3 kg of CO₂ = _____ kg CO₂ emitted / year.

Many people plant trees to offset their CO₂ emissions.

One tree absorbs on average 15.5 kg of carbon dioxide per year.

How many trees will your selected driver need to plant if he /she wants to offset his / her carbon emissions?

NAME OF DRIVER	CO ₂ EMITTED IN A YEAR	NUMBER OF TREES REQUIRED TO OFFSET CO ₂ EMISSIONS

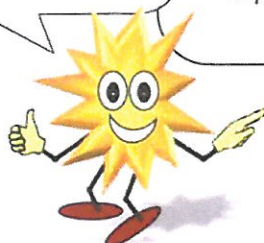
Use this formula: Number of Trees = CO₂ kg / 15.5 kg

HERE ARE SOME REAL FACTS

Average fuel used to transport **ONE PERSON** for 100 km in different modes of transport:

- 1 person travelling in an average large car - 12 litres per person
- 1 person travelling in an average small car - 8 litres per person
- 4 people travelling in an average large car - 4 litres per person
- 4 people travelling in an average small car - 3 litres per person
- 40 people travelling in a large diesel bus - 2 litres per person

Of course walking and cycling are even more fuel-efficient!



SECTION C BRINGING IT HOME

Venue: Museum / Passage

DID YOU KNOW THAT
Energy Use = Water Use
&
Water Use = Energy Use

PUTTING YOUR HOUSE IN ORDER

Vusi and his family live in a 3-bedroom, 2 bathroom house in Johannesburg. Vusi has a keen interest in environmental issues and decided it was time to put his house in order! He and his family performed a household audit, looking at their energy and water use. They used the audit to help them look at changes that could be implemented without changing the family's quality of life. The audit led to some important changes. Here are some of the changes they implemented:



Geyser timer



Geyser



Dual-flush toilet



Low flow showerhead



Aerator taps

The Electricity bill:

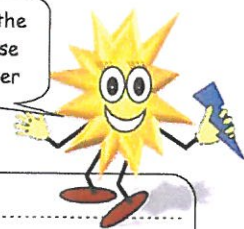
- Before the changes, Vusi's household electricity bill stood at an average of 3,122 kWh per month. This was costing his family R1,217.00 each month.
- The electrical changes cost R738.00.
- A month after the changes the electricity bill came down to 1 794 kWh - a saving of 1 327 kWh every month.
- Their monthly bill was now R700.00, saving some R500.00 per month for the family. The costs of changes were paid off within 6 weeks from the electricity savings!



The Water bill:

- Water usage before the changes stood at a monthly average of 40.5 kl, costing about R400.00 per month. The plumbing alterations cost the family R1,385.00
- As a result of the changes, the changes the family's water usage dropped to 26.9 kl and their monthly bill was approximately R270.00.
- This is a saving of some R130.00 per month for the family. With this saving the family paid off the cost of their plumbing changes within 10 months.

Hint: Look at the ways these wise folks save water



ACTIVITY LINKING WATER USE & ENERGY

Look at the poster illustrating how the Van Drips and the Van Plugs live. Describe below some of the things that the Van Plugs do to save ENERGY.

.....

.....

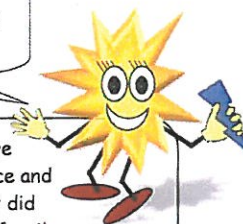
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SECTION D

Venue: Recycling Exhibit

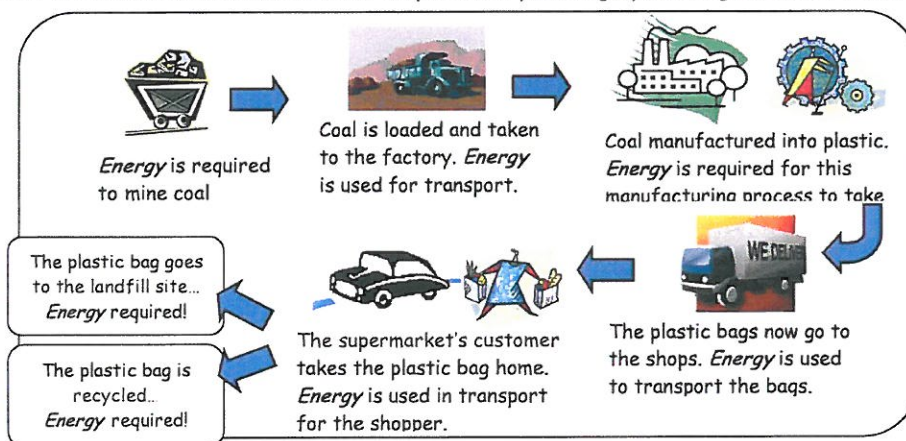
Here is the most basic fact:
EVERYTHING COMES FROM SOMETHING
Nothing is for Free!



EVERYTHING COMES FROM SOMETHING!

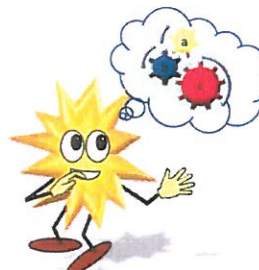
A multitude of products are used in our homes everyday. These products are manufactured in part or entirely from natural resources. Advances in science and technology have allowed us to manufacture a variety of "new" products that did not naturally occur on Earth from the basic resources of sun, water, wood, fossil fuels, biomass, nuclear reactors, wind etc.

Look at the illustration below which traces the process of producing a plastic bag from start to end.



ACTIVITY TRACKING THE PATH OF ENERGY

Choose a product and discuss the following questions with a friend:
Identify the resources required to make this product
What steps and processes were required to produce it?
Make a sketch below of the energy flow used to produce this product and get it to the end consumer.
(Refer to the above diagram as a guide.)



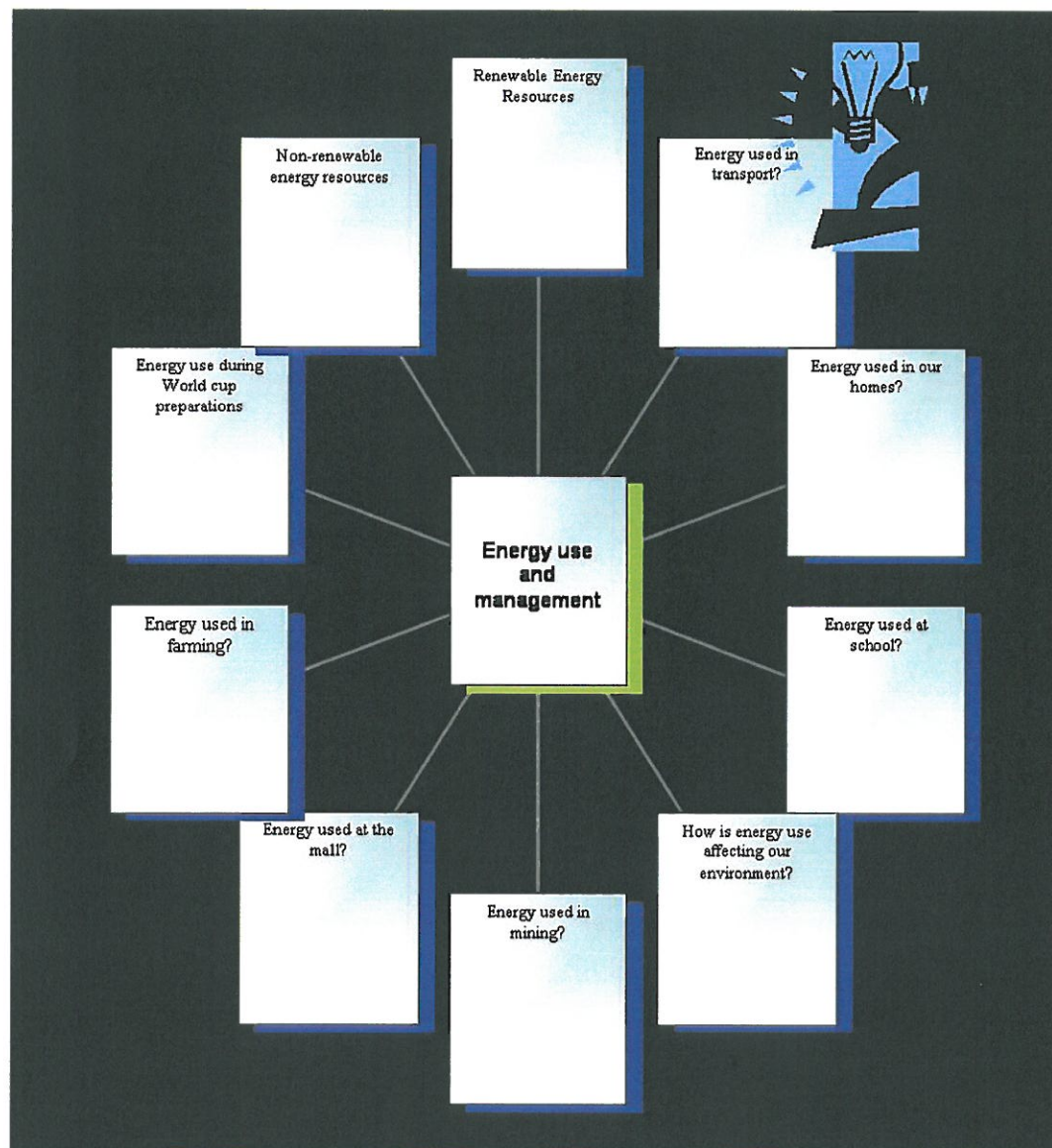
DESIGNING AN ENVIRONMENTAL CAMPAIGN

Look at the display of campaigns that have been taking place in South Africa. Choose one and using the checklist below, decide whether the criteria that allow for a successful campaign have been met. Make brief comments to substantiate your decisions.

NAME OF CAMPAIGN	
Purpose	
Message	
Audience	
Activities	
Resources	
Budget	
Partners / Stakeholders	
Output	
Evaluation / Successes / Difficulties	

You will be going back to school and starting an "Energy Dialogues" Campaign.

Appendix D: Mind map



Appendix E: Multifaceted survey example

Delta Environmental Centre

FINDING ENERGY-WISE FRIENDS!

INSTRUCTIONS: Fill this card by getting other players to sign their initials in the squares.

Find someone who:

Can explain the Kyoto Protocol K. L. Poncane	Walks to school or work K. Mkhobe	Uses a re-usable lunch bag/container M. Mphahlele C. Nkosi	Recycles at home M. Mphahlele K. L. Poncane B. Phelo A. Odia	Can define "sustainable use" of natural resources C. Poncane	Measures their own carbon footprint M. Mphahlele
Has done an energy audit at home or school 1	Grows their own vegetables at home K. Poncane	Uses a geyser blanket at home NONE	Can define the term "greenhouse effect" M. Mphahlele	Has started a recycling project at their school K. Mkhobe	Can define what is "climate change" M. Mphahlele
Uses solar power energy at home or school K. Mkhobe	Belongs to an environmental club NONE	Always switches lights off when leaving a room M. Mphahlele	Can define what is "global warming" All.	Can name an item responsible for carbon emissions All.	Takes a bus or carpool to get to school or work M. Mphahlele K. Poncane B. Phelo A. Odia
Has planted indigenous trees at home or school C. Nkosi	Has a compost bin at home NOTE	Knows what natural resource is used to make plastic K. L. Poncane	Can name 3 renewable sources of energy All	Can explain how being energy-wise can lessen the impact on climate change All	Can name 3 ways of saving energy ALL

Appendix F: Evaluation sheets

EVALUATION FORM – ENERGY USE AND MANAGEMENT

TO BE COMPLETED BY EDUCATORS

Name of School: _____ Name of Educator: _____ Date: _____

Total no. Learners from school: _____ Name of Education Officer (E.O.): _____

Please tick the appropriate box:	1 - Yes	2 - No	3- Partially	4–Not sure
Education Officers performance				
Was the EO's name tag visible				
Were the learners and educators welcomed in a friendly manner?				
Did the EO show enthusiasm for the subject?				
Was the EO knowledgeable on the subject?				
Were the activities explicitly explained?				
Learners Interaction				
Were the learners engaged in discussion?				
Were the learners enthusiastic about the topic?				
Did the learners ask more questions than usual?				
The mediation tools				
Were the activities appropriate for the grade 11 curriculum?				
Did the activities address the important issues of energy use and management?				
Were the activities challenging?				
Did the activities encourage learners to think critically?				

Please feel free to make comments or suggestions on the programme.

Appendix G: Ethics considerations

13 Ridgeway Gardens

Mondeor

2091

May 4, 2010

The Executive Officer
Delta Environmental Centre

Dear Madam

Research Title: Exploring Learning through Energy Dialogues in an informal learning centre

I, Marian Brown kindly request permission to research the energy dialogues programme that you intend on running in the third semester of 2010. I am currently enrolled for a Masters' degree in Science Education at the University of Witwatersrand under the supervision of Dr. Anthony Lelliott.

The purpose of the study is to examine the social interaction created by the programme activities and determine whether the dialogues improve the learners understanding of energy use and management, encourage learners to contribute to their own learning and allow them to evaluate science concepts critically. This study is important as it plans to determine how the activities initiate dialogue and whether the dialogue assists the teacher with achieving the curriculum learning outcomes.

During the data collection process I will observe the learners whilst engaging in the activities at DEC and during post visit arranged by DEC. The observations will be videotaped. All information collected in this study will be kept confidential and used only for the purpose of this study. No names or personal details of educational officers will be revealed in reporting the outcomes of the study. As an institution you are free to withdraw at any time during the study and where possible information collected will not be used in the study. Do not hesitate to contact me or my supervisor for clarification or more information.

Yours faithfully

Marian Brown

Cell: 0835052543

marianmerle@gmail.com

Supervisor:

Dr. Anthony Lelliott

Tel: 011 717 3420

anthony.elliott@wits.ac.za

Consent form for the Delta Environmental Centre

I (name of executive officer)_____ hereby allow Marian Brown to conduct her research on the premises of Delta Environmental Centre. I understand that the aim of the study is to investigate whether the energy dialogues in an informal learning environment assists learners with constructing their own knowledge on energy use and management.

Signature by Executive Officer:

Date:

13 Ridgeway Gardens

Mondeor

2091

May 4, 2010

Dear Parent

Research Title: Exploring Learning through Energy Dialogues in an informal learning centre

The grade 11 geography learners will be engaging in the Energy Dialogues programme at Delta Environmental Centre (DEC). I, Marian Brown intend on doing research on the programme. I kindly request your permission to involve your son/daughter in my research. I am currently enrolled for a Masters' degree in Science Education at the University of Witwatersrand under the supervision of Dr. Anthony Lelliott.

The purpose of the study is to examine the social interaction created by the programme activities and determine whether the dialogues improve the learners understanding of energy use and management, encourage group-work to force students to act and allow them to evaluate science concepts critically. This study is important as it plans to determine how the activities initiate dialogue and whether the dialogue assists the teacher with achieving the curriculum learning outcomes.

During the data collection process I will observe the learners whilst engaging in the activities at DEC and during post visit arranged by DEC. The observations will be videotaped. All information collected in this study will be kept confidential and used only for the purpose of this study. No names or personal details of participants or the name of the school will be revealed in reporting the outcomes of the study. Participants are free to withdraw at any time during the study and where possible information collected on such participants will not be used in the study. Do not hesitate to contact me or my supervisor for clarification or more information.

Yours faithfully

Marian Brown

Cell: 0835052543

marianmerle@gmail.com

Supervisor:

Dr. Anthony Lelliott

Tel: 011 717 3420

anthony.elliott@wits.ac.za

Consent form for the parent

Research title: Exploring Learning through Energy Dialogues in an informal learning centre

I (name of parent) _____ of (name of residence) _____, hereby allow (name of learner) _____ to participate in the study conducted by Marian Brown. I understand that the aim of the study is to investigate whether the energy dialogues in an informal learning environment assists learners with constructing their own knowledge on energy use and management.

Please tick the most appropriate box

	Yes	No
1. Do you voluntarily allow your child to participate in the study?		
2. Do you mind having your child observed at DEC?		
3. May your child appear on video that is used for data collection?		
4. Do you understand that the information collected will be used for research purposes only?		
5. Are you aware that you are free to withdraw your child at any time and information collected where possible should not form part of the study?		
6. Do you acknowledge that participation in the study will be voluntary and that no grades will be awarded?		

Signature by parent:

Date:

13 Ridgeway Gardens

Mondeor

2091

May 4, 2010

Dear, learner

Research Title: Exploring Learning through Energy Dialogues in an informal learning centre

The grade 11 geography learners will be engaging in the energy dialogues programme at Delta Environmental Centre (DEC). I, Marian Brown intend on doing research on the programme. I kindly request your permission to participate in my research. I am currently enrolled for a Masters' degree in Science Education at the University of Witwatersrand under the supervision of Dr. Anthony Lelliott.

The purpose of the study is to examine the social interaction created by the programme activities and determine whether the dialogues improve the learners understanding of energy use and management, encourage group-work to force students to act and allow them to evaluate science concepts critically. This study is important as it plans to determine how the activities initiate dialogue and whether the dialogue assists the teacher with achieving the curriculum learning outcomes.

During the data collection process I will observe the learners whilst engaging in the activities at DEC and during post visit arranged by DEC. The observations will be videotaped whilst the interview will be audio taped. All information collected in this study will be kept confidential and used only for the purpose of this study. No names or personal details of participants or the name of the school will be revealed in reporting the outcomes of the study. Participants are free to withdraw at any time during the study and where possible information collected on such participants will not be used in the study. Do not hesitate to contact me or my supervisor for clarification or more information.

Yours faithfully

Marian Brown

Cell: 0835052543

marianmerle@gmail.com

Supervisor:

Dr. Anthony Lelliott

Tel: 011 717 3420

anthony.elliott@wits.ac.za

Consent form for the learner

Research title: Learning through dialogues in an informal learning centre

I (name of learner)_____ of (name of residence) _____ will participate in the study conducted by Marian Brown. I understand that the aim of the study is to investigate whether the energy dialogues in an informal learning environment assists learners with constructing their own knowledge on energy use and management.

Please tick the most appropriate box

	Yes	No
1. Will you voluntarily participate in the study?		
2. Do you mind being observed for this research?		
3. Do you mind appearing on video that is used for data collection?		
4. Do you understand that the information collected will be used for research purposes only?		
5. Are you aware that you are free to withdraw child at any time and information collected where possible should not form part of the study?		
6. Do you acknowledge that participation in the study is voluntary and that no grades will be awarded?		

Signature by learner:

Date:

Consent form for the videotaping and audio taping

Research title: Exploring Learning through Energy Dialogues in an informal learning centre

I (name of parent/learner)_____ acknowledge that as a participant of the Research on Energy Dialogues conducted by Marian Brown, I/my child will be audiotaped and videotaped during the excursion at DEC. I am aware that the video tapes and audiotapes will be safely stored at the archives of the University of Witwatersrand and destroyed after three years. I understand that the videotape will only be viewed by the Researcher, the supervisors and the adjudicators of the project.

Signature by parent/learner:

Date:



UMnyango WezeMfundo
Department of Education

Lefapha la Thuto
Departement van Onderwys

Enquiries: Nomvula Ubisi (011)3550488

Date:	20 May 2010
Name of Researcher:	Brown Mariam Merle
Address of Researcher:	13 Ridgeway Gardens
	John Masefield Street
	Mondeor
Telephone Number:	0119454578/0835052543
Fax Number:	N/A
Research Topic:	Learning through Dialogues in an Informal Learning Centre
Number and type of schools:	2 Secondary Schools
District/s/HO	Johannesburg North

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

Permission has been granted to proceed with the above study subject to the conditions listed below being met, and may be withdrawn should any of these conditions be flouted:

1. The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.
2. The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.
3. A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.

Office of the Chief Director: Information and Knowledge Management
Room 501, 111 Commissioner Street, Johannesburg, 2000 P.O.Box 7710, Johannesburg, 2000
Tel: (011) 355 0809 Fax: (011) 355 0734

4. A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.
5. The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.
6. Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.
7. Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year.
8. Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.
9. It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.
10. The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.
11. The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.
12. On completion of the study the researcher must supply the Director: Knowledge Management & Research with one Hard Cover bound and one Ring bound copy of the final, approved research report. The researcher would also provide the said manager with an electronic copy of the research abstract/summary and/or annotation.
13. The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.
14. Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

Martha Mashego

ACTING DIRECTOR: KNOWLEDGE MANAGEMENT & RESEARCH

The contents of this letter has been read and understood by the researcher.	
Signature of Researcher:	
Date:	26/05/2010