

OMGEWINGSOPVOEDKUNDE-EN-BEWUSMAKINGSPROGRAMBEPLANNER

PROGRAMTIPE (maak 'n sirkel/kruisie): gemeenskaps-/volwasse opvoedingsprogram – ENERGIE

BESONDERHEDE

Naam van die skool/groep			
Getal leerders/deelnemers verwag	Werklike getal leerders/deelnemers	Programduur	1 uur
Plek (reservaat/ligging)	Graad/ouderdomsgroep		Volwassenes/tieners
Datum van funksie			
Is dit deel van die werkplan?	JA/NEE	Indien nee, motiveer waarom die program nodig is.	

INHOUD

	Tema (maak 'n sirkel/kruisie)	Energie
Weet	Onderwerpe wat behandel word (bv. watersiklus / belangrikheid van water)	Wat energie is Waarom dit belangrik is om energie te bespaar Hoe om 'n energie-oudit te doen
	Skakel met kurrikulum (slegs vir kurrikulumbelynde programme) – noem vak/trant/onderwerpe (indien nie in die onderwerpe hier bo gelys nie)	N.v.t.
Do	Vorige kennis benodig (indien van toepassing)	N.v.t.
	Vaardighede beoefen (maak 'n sirkel/kruisie)	Verduidelik, Identifiseer, Noem, Ontleed, Bied aan, Lees, Neem op, Rapporteer, Voer uit, Kies, Besluit
Waar	Sleutelboodskap (bv. ons moet water bespaar)	Ons moet energie bespaar.

ALGEMENE LOGISTIEKE

	Verantwoordelike persoon	Gedoen (merk)	Status
Nooi uit *			
Plek			
Vervoer			
Bespreking bevestig			
WCED-toestemming *			
Aanbiedingtoerusting en kamera			
Risikoassessering gedoen, bevestiging en kontrolelys gestuur			

Ander:

Plan versoek deur: _____ (naam)

_____ (datum)

Plan goedgekeur deur: _____ (naam)

_____ (datum)

Spyseniering *			
Vrywaring *			
Begroting en kostesentrum			

*Indien van toepassing

LESPLAN

Tyd	Plek	Aktiwiteit en verduideliking	Hulpbronne en persoon wat daarvoor verantwoordelik is om die hulpbron voor te berei of te bring	Fasiliterende personeel (indien meer as 1, dui die hooffasiliteerder en tydhouer aan)
INLEIDING EN YSBREKER				
5 minute		<p>Ysbreker – Coke-bottelaktiwiteit Om te dink waarom ons vir iets betaal wat ons vermors.</p> <p>Vra almal om buite in 'n sirkel te staan. Wys vir almal 'n bottel Coke wat energie verteenwoordig (Coke het suiker ens.). Sê vir almal om hulle te verbeel dat die bottel Coke in jou hande die laaste bottel Coke op aarde is, die laaste bron van voedsel/energie. Vra vir hulle om op die Coke-bottel te bly. Wat sal hulle daarvoor betaal? Sodra iemand jou vir die Coke betaal, maak dit oop en gooi die inhoud op die grond uit en gee die leë bottel aan die persoon wat dit gekoop het.</p> <p>Verduidelik dat dit is wat ons elke dag doen – ONS BETAAL VIR ENERGIE, MAAR GEBRUIK DIT NOOIT. Waarom? Jy kan dan 'n bespreking begin oor sommige van die onderstaande aspekte. Benadruk dat dit alles oor keuses gaan; ons kies om te vermors of te bespaar.</p>	Bottle Coke (Tee kan gebruik word om Coke te vervang ná dit die eerste keer gebruik is.)	
LIGGAAM/AKTIWITEITE				
10 minute		<p>Inleiding tot energie</p> <p>a) Hoe het jy jou dag begin?</p> <p>Verdeel in groepe. Hulle kan in hul groep bespreek wat hulle gedoen het sedert hulle wakker geword het en wanneer energie/elektrisiteit gebruik is. Hulle kan ook dinge noem soos "ek het my oë oopgemaak" (dit gebruik energie). 'n Paar voorbeelde:</p> <ul style="list-style-type: none"> • Ek het die lig aangeskakel. • Ek het kombuis toe gegaan en die lig aangeskakel. • Ek het die stoof aangeskakel om pap te maak. • Ek het melk in die mikrogolf warm gemaak. • Ek het roosterbrood gemaak. <p>Gebruik 'n puntstelsel: 'n punt word bygevoeg elke keer wat elektrisiteit gebruik word. Loer in by elke groep om te rapporteer waarvoor hulle elektrisiteit gebruik het en hoeveel punte hulle ontvang het.</p> <p>Wanneer al die groepe gerapporteer het, vra die fasiliteerder die hele groep wie het die meeste elektrisiteit gebruik vir slegs die oggend.</p>	Witbord Witbordpen Energie-aanbieding	

15 minute		b) PowerPoint-aanbieding oor energie		
20 minute	Voer 'n huishoudelike energie-oudit, koste-van-energie-oudit of koolstofvrystelling uit.	'n Praktiese voorbeeld van hoe eenvoudig dit is om 'n verandering in ons daaglikse lewens te maak wat energie sal bespaar – 'n bewys dat ons dit self kan doen. Een ding wat ons KAN doen. Bespreek die resultate en kyk hoe elkeen energie/elektrisiteit kan bespaar.	Energie-ouditblaai (<i>Smart Living</i> -handboek) en potlode – sien inligting hier onder. Druk kopieë vir elke persoon uit sodat hulle die vorm kan invul. Sakrekenaar of twee	
KONSOLIDASIE EN EVALUERING				
10 minute	Konsolidasie	Een ding wat ons sal doen om energie te bespaar Bespreek een ding wat elke persoon sal doen om in die toekoms energie te bespaar. Vra elke persoon om hul belofte op 'n stuk papier te skryf, vorentoe te kom, dit te lees en op die muur of blaaibord te plak.	Opgesnyde papier, penne/Koki's, blaaibord	

Hulpbronerkenning en -verwysing: Stad Kaapstad

✓ **cause quality and sustainability problems** with the grid, as actual generation capacity and schedules are unknown to the City.

City Connect explains the PV registration process in detail and provides the necessary forms. Find the link under **"CONTACTS AND RESOURCES"**.

EXERCISE: DOING AN ENERGY AUDIT OF YOUR HOME

This exercise will help you understand exactly where you use electricity in your home, and where you can save.

STEP 1: COLLECT THE DATA

In column 1 of the table on the following page, list the appliances you have in your home.

In column 2, note the electricity power (W) of each appliance. Appliance power is usually measured in watts and written on the appliance itself. (Note, however, that this can indicate maximum power use, which could be higher than average power use.) The table 'Average electricity consumption of typical home appliances' on page 218 provides estimates for common appliances, which may be helpful.

If you have more than one of any appliance, such as lightbulbs, write down in column 3 how many of each appliance you have.

In column 4, record how long (for how many hours) each appliance is used per day. Consider differences in weekday and weekend use, as well as summer and winter use, and calculate an average.

Note that some appliances, such as fridges and hot-water cylinders, regulate themselves by constantly switching on and off. Consult the table on page 218 to estimate your consumption.

STEP 2: DO THE CALCULATIONS

To determine your daily electricity consumption, use this simple formula:

$$\frac{(\text{Watts} \times \text{hours used per day} \times \text{number})}{1\,000} = \text{daily consumption in kilowatts}$$

In essence, therefore, you are multiplying column 2 by column 3, and then by column 4 (if there is more than one item). This final figure is then divided by 1 000 to convert from watt-hours to kilowatt-hours, because 1 kilowatt (kW) = 1 000 watts (W). Fill in the total in column 6 to get an estimate of your daily use per item.

Add up your total kilowatt-hours for all appliances to calculate your total electricity consumption. To get your monthly consumption figure, multiply your total daily figure by 30,4 days.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
APPLIANCE DESCRIPTION	POWER USE PER UNIT (WATTS)	HOURS/DAY IN USE (HOURS)	NUMBER OF UNITS	AVERAGE NUMBER OF WH PER DAY (WATT X APPLIANCES HOURS/1 000)	AVERAGE KWH PER DAY
e.g. LED lamp	5 W	6 hours	7 lights	$5 \times 7 \times 6 = 210 \text{ Wh/day}$ divide by 1 000 to get kWh/day	0,21 kWh



AVERAGE ELECTRICITY CONSUMPTION OF TYPICAL HOME APPLIANCES

APPLIANCE DESCRIPTION	POWER USE (WATTS)	AVERAGE HRS/DAY IN USE	APPLIANCE DESCRIPTION	POWER USE (WATTS)	AVERAGE HRS/DAY IN USE
LIGHTING			REFRIGERATION		
LED downlight	5	5	Chest freezer	105	4
Halogen downlight	50	5	Fridge - with freezer	158	5
Incandescent bulb	60	5	Fridge - no freezer	250	5
Compact fluorescent light	18	5	HOME MAINTENANCE		
LED lamp	8	5	Dishwasher	2 500	0,9
LED security light	10	8	Vacuum cleaner	1 000	0,5
Halogen security light	150	8	LAUNDRY		
COOKING			Iron	980	0,4
Coffee machine	670	0,5	Steam iron	1 235	0,8
Electric stove	3 000	2	Washing machine	3 000	0,75 *
Frying pan	1 250	0,4	Tumble dryer	3 300	0,5 *
Kettle	1 900	0,3	* indicates per load		
Hotplate - large	2 400	0,3	OTHER		
Induction stove	2 000	0,3	Burglar alarm	10	24
Microwave oven	1 230	0,8	Cellphone charger	9	2
Toaster	1 010	0,3	CD player	9	0,4
Snackwich maker	1 200	0,3	Computer	134	1,5
Food processor	166	0,2	Cordless phone	2	15
GEYSER			Hair dryer	647	0,1
Electric geyser	2 600	4,4	Radio	12	3
Solar water heater, with electric backup	2 600	1,7	Pool pump - variable speed drive	200 to 1 200	winter 2 x 4 h
Heat pump	1 250	2,5			summer 2 x 6 h

STEP 3: IDENTIFY PRIORITY ACTION AREAS AND POTENTIAL FOR SAVINGS

Examine your results and identify which areas of the home use the most electricity. By doing this, you can take simple, effective cost-saving actions to reduce your electricity consumption. A simple way to check the accuracy of your audit is to compare it to your actual electricity units used. Remember, it might change depending on the season and number of people in your home. Yet it remains a good yardstick.

EXERCISE: DETERMINING THE COST OF ENERGY IN YOUR HOME

This exercise will look at the amount of money spent on energy, instead of total energy consumed. Understanding what uses most energy (and money) will help you identify where you can make savings.

STEP 1: COLLECT THE DATA

In column 1 of the table on the following page, list the fuels you use, such as electricity, paraffin, gas, batteries, wood or candles.

In column 2, note the different purposes for which you use each fuel, such as cooking, lighting, entertainment, heating, refrigeration or ironing. You could even include transport fuel and costs if you want to get the full picture.

In column 3, write down how much of each fuel you use in a week.

In column 4, write down the price of the fuel for each unit, such as a litre or kilogram of fuel.

STEP 2: DO THE CALCULATIONS

To determine the cost of each fuel per week, multiply the amount you use (column 3) by the cost per unit (column 4). Write down the result in column 5. If you wish to obtain a rough monthly figure, multiply this by 4.2.

FUEL DO YOU USE?	FUEL USED FOR?	FUEL DO YOU USE PER WEEK?	PRICE OF THE FUEL PER UNIT?	WEEK FOR FUEL?
ELECTRICITY				
PARAFFIN				
GAS				
BATTERIES				
WOOD				
TOTAL COST				

STEP 3: IDENTIFY PRIORITY ACTION AREAS AND POTENTIAL FOR SAVINGS

Think about where you spend the most money on energy every week and use the tips in this chapter to make better energy choices. Also look at "A safe home" on page 222 to see whether you can improve on energy safety in your home.

CALCULATING YOUR HOUSEHOLD'S CARBON EMISSIONS

Different fuels have different carbon dioxide (CO₂) emissions levels. Electricity in South Africa emits substantial amounts of CO₂, as it is derived from the burning of low-grade coal. For a quick estimate of your energy consumption and related carbon emissions, follow these steps:¹⁸

- ✓ **Step 1:** If you do not have a record of your electricity and fuel bills, fill in the amount of fuel you use each month in column 1.
- ✓ **Step 2:** Multiply this by the value provided in column 2. For example, for electricity, this is 0,995. This will give you the kilograms of CO₂ you emit per month. Write this in column 3.
- ✓ **Step 3:** For your annual CO₂ emissions, multiply column 3 by 12 months, and add for all fuels.
- ✓ **Step 4:** If you want to calculate this per tonne, you will need to divide it by 1 000, as 1 tonne = 1 000 kg.

COLUMN 1: FUEL USAGE PER MONTH	COLUMN 2: EMISSIONS FACTOR	COLUMN 3: CARBON EMISSIONS - KG CO ₂
Electricity: _____ kWh	x 0,995 kg CO ₂ per kWh	kg CO ₂ /month
LPG: _____ kg	x 1,622 kg CO ₂ per kg	kg CO ₂ /month
Paraffin: _____ litres	x 2,577 kg CO ₂ per litre	kg CO ₂ /month
Total household energy-related emissions per month		kg CO ₂ /month
Total household energy-related emissions per annum		kg CO ₂ /annum

Compare your household's carbon emissions with typical annual CO₂ emissions from Cape Town homes, excluding transport.

HOUSEHOLD TYPE	KG CO ₂ /MONTH
Average low-income non-electrified home in Cape Town	146
Average low-income electrified home in Cape Town	193
Average mid-income home in Cape Town	737