The value of our electricity

Senior Phase (Grade 7)

Educator Guide

Natural Science and Technology

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How to save energy

Electricity is produced from fuel such as coal, water, diesel and uranium which are limited resources. An alternative to building new power stations to supply the increase in demand for electricity is to use what we have more efficiently (i.e. without wasting), one of the ways is to change the way we use electricity. Eskom's Integrated Demand Management (IDM) Energy Education programme motivates people to change the way they use electricity. Eskom has taken the approach of integrating energy education within the school curriculum.

The energy education programme is being introduced in the Senior Phase so that learners can see energy-saving as integral to their lives and put into practice as they grow. The activities are simple and can be adapted by the educator. The activities are within the context of the Curriculum and Assessment Policy Statement (CAPS) of the Department of Basic Education (DBE).

Note: The Eskom guides are in English. The educator will need to translate them into the Home Language.

Educators need to consult the Department of Education's CAPS policy guides for details of the skills, content and assessment within the relevant Phase and Grade.

Teaching Natural Sciences (Department of Basic Education, 2011, p13)

Careful selection of content, and use of a variety of approaches to teaching and learning Science, should promote understanding of:

- Science as a discipline that sustains enjoyment and curiosity about the world and natural phenomena
- The history of Science and the relationship between Natural Sciences and other subjects
- The different cultural contexts in which indigenous knowledge systems have developed
- The contribution of Science to social justice and societal development
- The need for using scientific knowledge responsibly in the interest of ourselves, of society and the environment
- The practical and ethical consequences of decisions based on Science.

Natural Sciences at the Senior Phase level lays the basis of further study in more specific Science disciplines, such as Life Sciences, Physical Sciences, Earth Sciences or Agricultural Sciences. It prepares learners for active participation in a democratic society that values human rights and promotes responsibility towards the environment. Natural Sciences can also prepare learners for economic activity and self-expression.

For the educator to take note:

- The energy-wise message is integral to all the activities.
- You may use the activities as they are.
- You can adapt or change the activities.
- You can use other resources where you see appropriate.
- Adapt the activities to suit the grade you teach.
- Adapt the activities according to the level of the learners (consider language or any other barriers).
- Share and discuss the activities with other educators in the same phase and grade.
- You can design your own activities that best suit the level of learners and grade you are teaching.
- Practice the energy-saving behaviour so you become an example of what is expected.
- Share your knowledge and practice on energy-wise education with everyone at school, at home and in the community.
- Saving energy means we don't have to produce so much, using our limited natural resources and limiting the amount of pollution we create, thus taking better care of our envirnment.

Thank you for taking care of our earth

Energy-saving

Grade 7

The activity/activities which follow have reference to the content from the Department of Education's (2011) CAPS policy document - Natural Science Senior Phase (Grades 7, 8, 9) (p31).

Term 3

Strands: Energy and change
Topic: Sources of energy

Grade 7 Term 3				
Strands: Energy and change				
Time	Topic	Content & Concepts	Suggested Activities: Investigations, Practical work, and Demonstrations	Equipment and Resources
1 week	Sources of energy	Renewable and non-renewable sources of energy • Energy is needed to make everything work, move or live • A source of energy has energy stored waiting to be used, or energy that is needed to make something happen – non-renewable sources of energy cannot be replenished once used, such as fossil fuels (coal, oil, natural gas) and nuclear fuels (such as uranium) [Link to Planet Earth and Beyond Grade 7 Term 4] – Renewable sources of energy are continually replenished, such as hydro power, wind, sunlight, biofuel (wood).	• Listing non-renewable and renewable energy sources. Explain why they are regarded as non-renewable. • Listing renewable energy sources. Explain why they are regarded as renewable.	• Textbooks and reference materials • Pictures and reading texts about non-renewable and renewable sources of energy

Strand: Energy and change
Topic: Sources of energy

Content: Renewable and non-renewable sources of energy

- Energy is needed to make everything work, move or live.
- A source of energy has stored energy waiting to be used, or energy that is needed to make something happen.
- Non-renewable sources of energy cannot be replenished once used i.e. the resource cannot be used again.
  Non-renewable resources take a long time (hundreds or thousands of years) to form e.g. fossil fuel like coal.
- Renewable sources of energy are continually replenished i.e. the resource can be used again. Renewable resources do not take a long time to form and it is available e.g. sunlight.

Activity 1: Renewable and non-renewable resources

This activity focuses on renewable and non-renewable resources.
This activity also intends to bring out energy-saving messages.

The learners need to gather information from different sources available to them on renewable and non-renewable resources. Learners can share the information with each other. You can give learners the task of getting the information at least two or three days before the lesson.

You can have a class discussion by allowing learners to share the information with the class.

If you have the facilities show a DVD on alternative sources of energy.
Try the Eskom School Yard website for visual material.
www.**eskom**.co.za/**sites**/idm/**SchoolYard**/Pages/**SchoolYard**.aspx

For question 3 put the learners into groups of four. The learners should not get into unnecessary expenses for this activity – old working parts can be used. It is about giving learners experience through trial and error to understand how alternate sources of energy can work on a larger scale.

The learners can demonstrate their models/circuits to the rest of the class.

Ask the learners to complete the activity sheet.

Review the activity sheet with the learners.

You can adapt or change the activity sheet to suit your lesson.

Introductory notes extracted from the CAPS policy document should be given prior to the activity. Discuss these notes with the learners.

Read the introductory notes given on renewable and non-renewable resources and then do the activity.

The table below shows a list of different resources that can be used to drive dynamos (generators) to generate electricity for the national grid. Some of the resources are renewable and others are non-renewable.

1.1. You must research (find out more about) each alternative source of energy given in the table below. Classify the resource as renewable or non-renewable by placing a tick in the correct column. Explain why you ticked the resource as renewable or non-renewable.

Alternate Source of energy	Renewable or	Non-renewable	Explanation
1. Wind	Yes	-	Continuously replenished – it does not have to form again.
2. Waves in the sea	Yes	-	Continuously replenished – it does not have to form again.
3. Falling water (Hydro-electric)	Yes	-	Continuously replenished – it does not have to form again.
4. Solar (Sunlight)	Yes	-	Continuously replenished – it does not have to form again.
5. Fossil fuel (Coal)	-	Yes	Once used up – it takes hundreds of years to form.
6. Nuclear Fission (Nuclear energy)	-	Yes	Once used up – it is "spent"- cannot be used again.
7. Fossil Fuel (Natural Gas)	-	Yes	Once used up – takes hundreds of years to form.
8. Biofuel (fuel usually made from plants – wood)	Yes	-	Continuously replenished -Plants can be grown within short time
9. Fossil fuel (Oil)	-	Yes	Once used up – it takes hundreds of years to form

1.2 For each of the resources given in the table get pictures from old magazines and newspapers and stick them in. Label them as renewable or non-renewable.

2. Read the fact sheet below and answer the questions

Some interesting facts:

South Africa depends largely on coal to produce most of its electricity. Tonnes of coal are burnt to provide the initial energy for the production of electricity.

For every kWh of electricity produced Eskom uses:

- 1,27 litres of water
- 0,49kg of coal

For every kWh of electricity Eskom (through the burning of coal) produces:

- 132,62g of ash
- 0,29g particulates (fine particles of ash in emissions)
- 7,56g SO_2 (sulphur dioxide)
- 3,55g N_2O (nitrous oxides)
- 0,89g CO_2 (carbon dioxide)

2.1 Is water a renewable or non-renewable resource? [Renewable]

2.2 Is coal a renewable or non-renewable resource? [Non-renewable]

2.3 Give reasons why it is important to use electricity wisely. [Coal is a non-renewable resource – wasting electricity means wasting coal/although water is renewable there can also be a shortage if there is not enough rain in the catchment areas. Wasting electricity means that a valuable resource like water is also wasted since water is required in the process of generating electricity].

3. Here is a challenge for you. (It would be good to work in groups of four for this challenge).

- Get a small torch bulb.
- Build a little windmill or get a small solar panel.
- See if you can get the torch bulb to switch on using these renewable sources.
- You will need other components as well e.g. connecting wires, a little motor…

Strand: Energy and change

Topic: Insulation and energy-saving

The topic: Insulation and energy-saving

Activities 1, 2 and 3 which follow have reference to the content from the Department of Education's (2011) CAPS policy document - Natural Science Senior Phase (Grades 7, 8, 9) (p31).

Time	Topic	Content & Concepts	Suggested Activities: Investigations, Practical work, and Demonstrations	Equipment and Resources
	Heat Transfer [Continued…]	Convection • Is the transfer of energy from one place to another by the movement of liquid or gas particles • Air and water expand when heated and the practices move upwards. When cooled they move down again. This is called a convection current. Radiation • Radiation is the transfer of heat and does not require physical contact or movement of particles. • The heat from the sun travels mainly by radiation across empty space to the earth. • Shiny surfaces (such as silver) are good reflectors of radiant heat and dark surfaces (such as black) absorb heat energy [Links to Light in Grade 8 and FET] • Radiation heats up dark surfaces more quickly (absorb heat) than it heats up shiny surfaces (reflect heat)	• Demonstrating convection currents in water in a transparent container • Drawing and labelling to explain why heaters are best placed near the floor and air conditioners are best placed near the ceiling • Demonstrating heat energy transfer through radiation using a candle • Investigating/ Demonstrating and measuring the amount of radiant heat absorbed using dark coloured (matt black), light coloured (white, yellow) and Shiny (silver) surfaces [make envelopes of different coloured paper and aluminum foil, insert thermometers, place in the sun and measure the temperature increase overtime] – Draw a line graph to show the results	• Food colouring or crystal of potassium permanganate • Glass/transparent plastic container • Candles • Shiny silver surfaces (wrapped by aluminum foil) • Matt Black surfaces (painted matt black) • Thermometers • Cardboard or paper and glue
2 weeks	Insulation and energy saving	• Using insulating materials • Heat can be 'lost' through conduction, convection and radiation from our bodies and objects such as electric geysers. • Heat can also be gained through radiation, convection and conduction, for example solar water heaters • People insulating materials to help minimize heat loss in winter or heat gain in summer • Insulating materials slow down heat transfer (heat loss or gain) through conduction, convection and radiation, insulators are used o For making things such as "cooler boxers" o In the ceiling of buildings, o For clothing (such as coats, jerseys, woolly hats) and blankets • Conservation of heat energy in homes and buildings can be improved by minimizing heat loss in winter and heat gain in summer • Many indigenous, traditional homes and technologies in South Africa are designed for our climate and to be energy efficient	• Explaining how a solar water heating system works, in terms of radiation, conduction and convection (use real examples, pictures or diagrams) • Investigating different insulating materials (such as Styrofoam, newspaper, plastic, glass by how well they keep hot objects hot (such as a cup of tea) or prevent cold objects (such as ice) from heating up. Measure temperature loss or gain and record results. Sequence the insulators from very good to poor. • Designing, making and testing a system (hot box/wonder box) which uses insulating materials to keep food hot for longer or to keep ice cold o Measure temperature change after some time. Record results and draw a line graph Or o Designing, making and testing a model of a well-insulated house to minimize heat loss	• Pictures / diagrams of solar water heaters • Video clips from internet • Thermometers • Insulating materials such as Styrofoam, newspaper, plastic and glass containers, ice • Cooking pot (or container). Cardboard box to make a "hotbox", insulation materials such as paper, fabric, cushions, blanktets • Materials to build a model of a house • Insulating materials

- Recap with learners the content on convection, conduction and radiation. You would have covered this content in the previous week.

Content: Insulating materials

- Heat can be 'lost' through conduction, convection and radiation from our bodies and objects such as electric geysers.

Recap	
Conduction: Conduction is the transfer of heat energy between matter (materials) that is in direct contact with each other. Some materials are able to conduct heat better than others. The closer the particles are arranged, the quicker the heat moves or is transferred by conduction. For example: A pot on the stove.	
Convection: Convection is the transfer or movement of heat by the actual movement of the warmed matter e.g. water or air. The movement is usually in a circular pattern. Convection occurs in liquids and gases. For example: When water is boiled the hot water rises and the cold water sinks, this continues until all the particles are heated.	
Radiation: Radiation is the transfer of energy by electromagnetic waves. Radiation does not rely upon any contact between the heat source and the heated object. For example: We feel heat from the sun though we are not touching the sun.	

- Heat can also be gained through radiation, conduction and convection, for example solar water heaters.

Activity 2: Insulating materials – A solar water heating system

After the recap of conduction, convection and radiation discuss solar energy.

Ask the learners questions like: Why is solar energy a renewable resource?

Ask the learners to give examples of appliances or products that use solar energy (you can use the example of a solar calculator).

Give the learners the worksheet. In pairs, ask the learners to discuss the solar water heating system.

Then ask the learners to redraw diagram 3 and to explain how the solar water heating system works.

Review the diagram by getting feedback from the class.

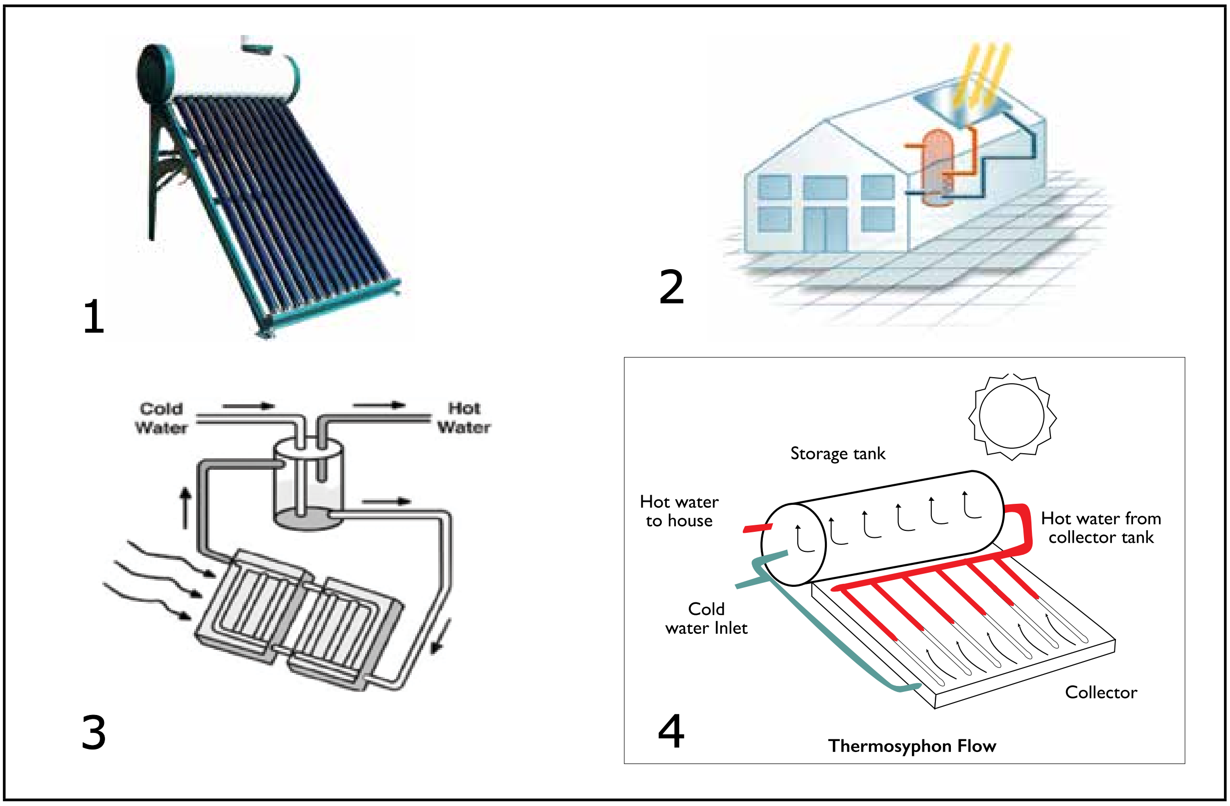
Notes:

Solar water heating systems are an alternative source to using electricity to heat water like in geysers.

Solar energy is known as a "clean" form of energy. Using solar energy will reduce the environmental impact of burning coal.

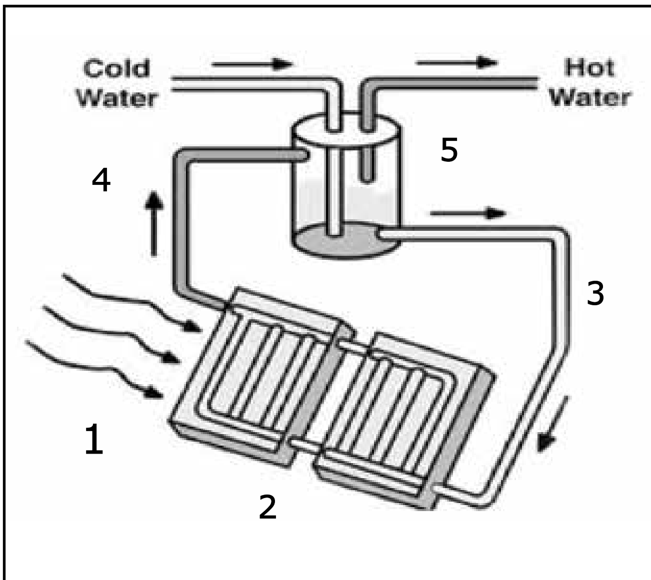
Solar energy is a renewable energy source when compared to coal which is a non-renewable resource.

There are many different designs of solar water heating systems. The diagrams below show such designs.



1.1 Redraw diagram 3.

1.2 Explain the solar water heating system on the diagram using your knowledge of heat transfer through conduction, convection and radiation.



1. Radiation – the sun rays strike the exchanger pipes. Heat is transferred to the pipes.
2. Cold water from (3) is continuously moving into the exchange system. The heat from the pipes is transferred to the cold water in the pipes by means of the process of conduction. The water is heated.
3. Cold water continues to move into the heat exchange system.
4. The heated water moves into the tank.
5. The cold water in the tank sinks to the bottom while the heated water rises up – convection.

Activity 3: Conservation of heat energy in homes and buildings

Put the learners in groups of three.

- Ask learners to discuss and write down different ways one can keep cool in summer and warm in winter. Give the learners about 10 minutes for this task.
- Get feedback from the different groups.
- Give the learners the worksheet. Let the learners do the worksheet in groups.
- Emphasise to the learners that they should think of ideas that do not include the use of electricity.
- Get feedback from the class.

Key points:

- People use insulating materials to help minimise heat loss in winter or heat gain in summer.
- Insulating materials slow down heat transfer (heat loss or gain) through conduction, convection and radiation. Insulators are used for making things such as "cool boxes", in the ceilings of buildings, for clothing (such as coats, jerseys, woolly hats) and blankets.
- Conservation of heat energy in homes and buildings can be improved by minimising heat loss in winter and heat gain in summer.
- Many indigenous, traditional homes and technologies in South Africa are designed for our climate and to be energy-efficient.

The diagrams below show typical heat loss from homes. How can the design of the home be improved to become more energy-efficient:

1. To conserve heat in winter.
2. To keep cool in summer.

Think of ideas that do not use electricity.

Include behaviours that we can also put into practice to conserve energy to keep warm in winter and to keep cool in summer.

Winter:

- Seal air leaks (around windows and under the doors)
- Add insulation to the walls
- Insulate the roof – traps the heat
- Walls should be thicker
- Insulate the roof
- Replace broken windows
- Use double glaze windows
- Open the curtains as soon as the sun rises
- Install solar heating systems
- Upgrade lighting to energy-efficient lighting
- Use warm clothes – do not depend on the heater

Summer:

- Seal air leaks (around windows and under doors)
- Add insulation to the walls – can reflect about 95% radiant heat and emit about 5% heat
- Insulate the roof – to reflect the radiant heat
- Replace broken windows
- Use double glaze windows
- Open the curtains later in the day - this allows the sunlight to be filtered keeping the inside cool for a longer period.
- Drink lots of water/wear light clothes – do not depend on air-conditioners and fans.

Activity 4: Insulating materials – Designing a "hot-box/ wonder cushion"

- Bring a "wonder cushion" to the classroom – some learners might not have seen one.
- Ask questions about how the wonder cushion works.
- Correct misconceptions about how the wonder cushions works.
- You can do the investigation as a class using the "wonder cushion" you have brought.
- Get the learners to work in groups to make the wonder cushion. They may not be able to complete this activity in class. Learners are not to get into unnecessary expenses. Used/waste material can be used.
- Give the learners the activity sheet.

Insulating materials slow down heat transfer (heat loss or gain) through conduction, convection and radiation. Insulators are used for making things such as "cool boxes", in the ceilings of buildings, for clothing (such as coats, jerseys, woolly hats) and blankets.

Insulation – insulation is the process of containing heat by trapping air inside and around a device/object and by reflecting thermal radiation back into a device (object).

Notes:

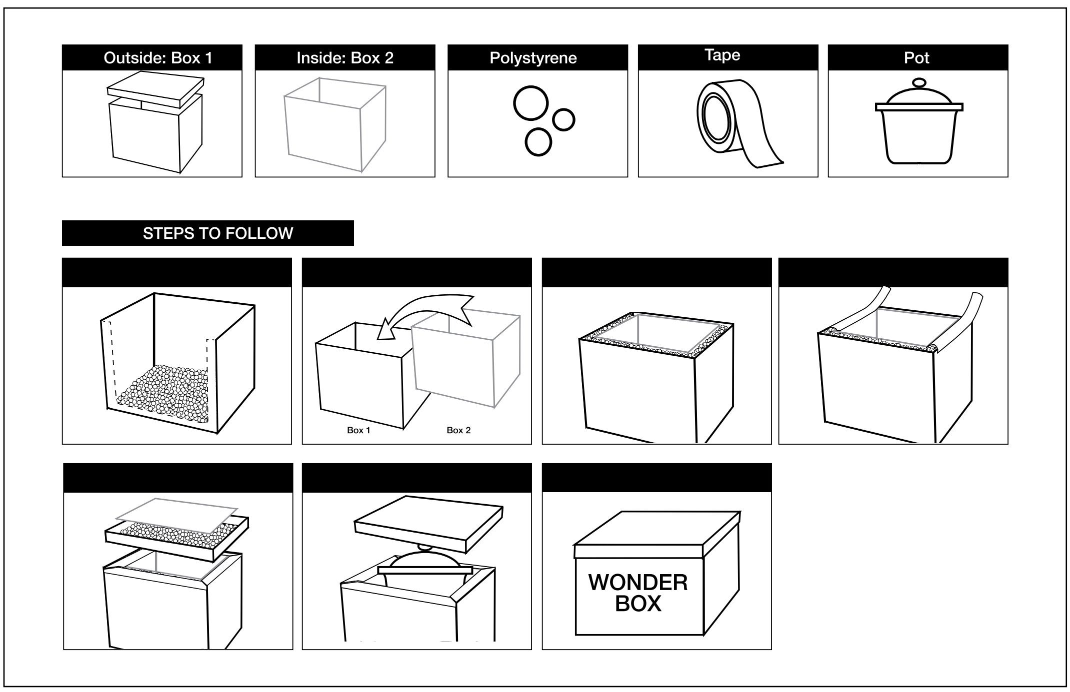
Thermal energy is any energy that comes from a heat source for example fire, the sun, a hot stove.

Task: Designing, making and testing a system ("hot box/wonder box/wonder cushion") which uses insulating materials to keep food hot for a longer period or to keep ice cold.

A wonder cooker/wonder cushion/wonder box also helps in cooking or keeping your food warm. Wonder cushions work on the principle of insulation. Insulation means to retain or keep the heat in. Be as innovative as you can and make your own wonder cushion.

Here is how you can make your own wonder cushion.

1. You can use a cardboard box or you can sew up a wonder cooker cushion using cotton material.
2. You need to create a pocket all around the inside of the box or bag and at the bottom of the bag or box.
3. Fill the pocket with polystyrene chips. The chips should be tightly packed.
   * Polystyrene is the rubbery type substance that is placed in boxes to protect items being transported. Sometimes they are in the form of "chips" or can be found in the form of small round balls.
4. Close the pocket with tape or sew it closed if cloth is used.
5. The lid of the box or the bag should also have a pocket which is to be filled with polystyrene chips.



6. Test your wonder cushion by recording the temperature as shown in the table below. You will need a thermometer. Caution: Take care when using warm water.

	Action	Temperature
1.	- Place a pot of warm water inside the cushion. - Record the temperature	Whatever temperature you have observed [20°C]
2.	- Leave the pot in the cooker cushion for 1 hour - Record the temperature	Whatever temperature you have observed [20°C or over]
3.	Write down your observations. [The water remained hot].	
4.	Explain your observation. [The cushion was insulated. It does not allow any heat to be lost to the environment].	

7. Study the picture and answer the following questions.

1. What is the basic principle on which the wonder cushion is made? [Insulation – heat is retained].

2. Why are polystyrene chips used to fill the bottom, inside and top cover pockets of the wonder cushion? [Polystyrene is an insulator – it forms a complete insulating layer around the wonder cushion - prevents heat from escaping].

3. Why should one never leave the wonder cushion on a metal surface while in use? [Some heat may be lost/transferred to the metal].

4. Find ways in which you can further insulate your wonder cushion (while still making it appear presentable). [One can add another layer of polystyrene/one can place the wonder cushion in an insulated box].

5. Explain why using a wonder cushion is an energy-efficient way of cooking or heating food. [One is not using electricity/it is a "clean" form of energy – there is no pollution].

Strand: Energy and change

Topic: The national electricity supply system

The topic: The national electricity supply system

Activity 1 which follows has reference to the content from the Department of Education's (2011) CAPS policy document – Natural Science Senior Phase (Grades 7, 8, 9) (p34).

Time	Topic	Content & Concepts	Suggested Activities: Investigations, Practical work, and Demonstrations	Equipment and Resources
1 week	Energy transfer to surroundings	Useful and 'wasted' energy • Systems such as appliances, tools , vehicles, machines provide useful energy outputs • Some energy that is transferred in a system can escape to the surrounding environment as 'wasted energy' • The output energy in a system is always less than the input energy, because some of the energy escapes to the surroundings • 'wasted' energy can escape in the form of heat and/or sound • – sound is an example of 'wasted' energy in an electric drill, food processor, hair dryer • – heat is example of 'wasted' energy in a candle, lamp, engine	• Researching the waste of energy from different machines and appliances such as • A car which wastes about 65% of the energy from fuel in the form of heat • A power station which wastes about 50% of the energy from burning coal. To surroundings • Identifying the input energy, useful output energy and 'wasted energy' when systems are operated. [use real examples or pictures of systems such as electric drill, electric iron, kettle, food mixer, candle engine, paraffin lamp]	• Pictures or examples of tools/ appliances such as electric drill, electric iron, kettle, food mixer
1 week	The national electricity supply system	**Energy transfers in the national grid** • the national electricity grid system (circuit) • the electricity is supplied in the following sequence – energy from sources such as coal, oil, gas, nuclear fuels, falling water and wind, is transferred to turbines • – turbines transfer energy to a generator • – a generator changes energy from mechanical movement into electricity an transfers the electricity into the wires of national electricity supply grid • – the wires transfers energy to the electrical appliances and lights • dynamos are small generators, which also change energy from mechanical movement to electricity • dynomos are used in some bicycle lights and mine helmets, and in wind-up torches and radios	• Interpreting diagrams of pictures of the national electricity grid; from the power station to the consumer. Explain the energy transfers.	• Picture of how electricity is generated in the power station, to the wires of the supply grid, to the electrical appliances in the home • Video clips from the internet • A dynamo (or pictures of how they are used)

Content: Energy transfer in the national grid

The national electricity grid is a system (circuit) or network of interacting parts.

The electricity is supplied in the following sequence:

- Energy from sources such as coal, oil, gas, nuclear fuels, falling water and wind, is transferred to turbines
- Turbines transfer energy to a generator
- The generator changes energy from mechanical movement energy into electricity and transfers the electricity into the wires/cables of the national electricity supply grid
- The wires transfer energy to the electrical appliances and lights.

The electrical energy that is generated is transmitted through electrical cables (or wires). The electrical energy moves through a network of interacting parts called the National Electricity Grid. However, energy is also "wasted" as it passes through the grid.

Dynamos are small generators, which also change energy from mechanical movement to electricity. Dynamos are used in some bicycle lights and mine helmets, and in wind-up torches and radios.

Activity 5: Energy transfer in the national grid

Ask learners for their ideas on how electricity is produced.

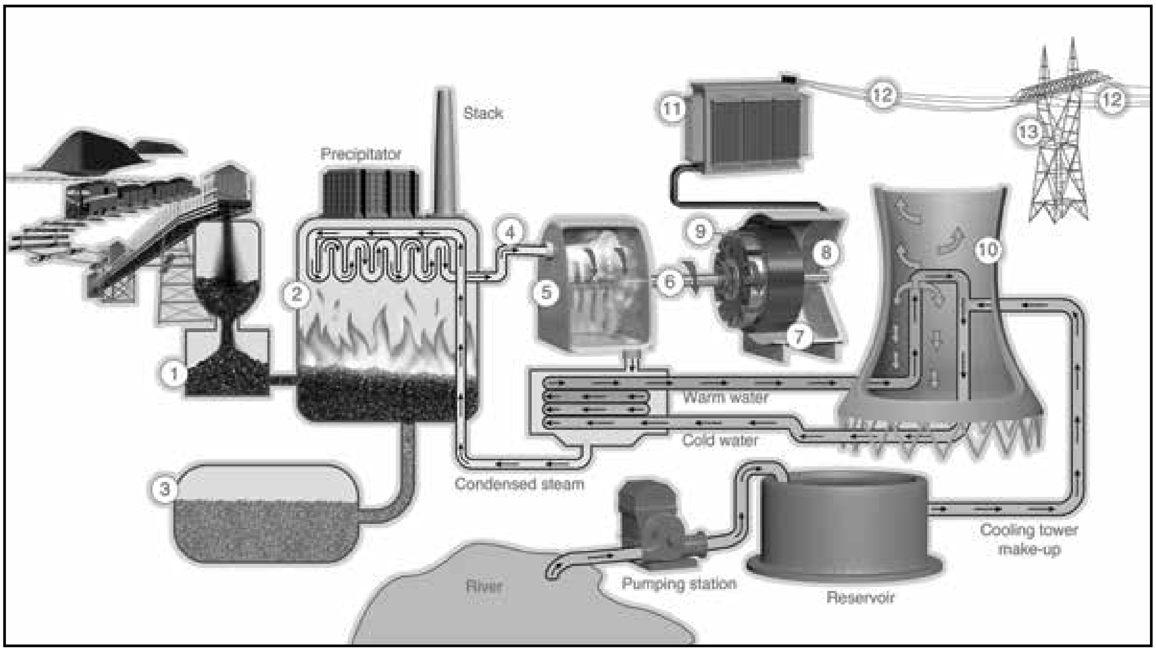
Build on their ideas using a simple flow diagram.

Give learners the worksheet.

Ask the learners to work in pairs to complete the worksheet.

Review the worksheet with the class.

Study the diagram that shows how electricity is produced and conducted.



1.1 Provide labels for numbers 1 to 13 on the diagram.

1. Coal pulveriser (coal mill)
2. Boiler
3. Ash (burnt coal)
4. Water to steam
5. Turbine
6. Rotating shaft linking the turbine and generator
7. Generator made up of a spinning rotor
8. Coil of copper wire
9. Magnet inside a coil of copper
10. Cooling tower
11. Step-up transformer
12. Transmission cables/lines
13. Pylon

1.2 Use a flow diagram to explain how electricity is produced and gets to the home.

Coal is mined → transported to the power station → coal is pulverised –
↓
water turns to steam ← heat is used to boil water ← coal is burnt
↓
steam drives a turbine (mechanical movement energy) → turbine drives a shaft
↓
movement energy transferred to generator ← shaft drives a generator
↓
electricity produced in the generator → electricity moves through cables to the home
↓
via wires to the appliance

1.3 Explain the energy transfer that takes place during the process of producing electricity using coal.

- Boiler (water to steam): Heat energy to movement energy
- Steam to turn the turbine: Heat energy to movement energy
- Generator: Movement energy to electrical energy

1.4 Which numbers (labels) would you leave out if water was used as the source to turn the turbine? [1,2,3,4]

1.5 Draw a flow diagram to show what happens after number 13.

Cables on pylons	→	substation	→	cables	→	meter box
						↓
Lights	←	wires	←	switch	←	wires

1.6 Keeping in mind that South Africa depends on coal for most of its electricity, why do you think it is necessary to use electricity wisely?

[Wasting electricity means wasting recources like coal and water]. Wasting electricity means unnecessary pollution of the air through the burning of coal. [Coal is non-renewable recources - we can run out of supply sooner due to the increasing demand as well].

Strand: Energy and change
Topic: Conserving electricity in the home

The topic: Conserving electricity in the home

Activity 6 which follows has reference to the content from the Department of Education's (2011) CAPS policy document - Natural Science Senior Phase (Grades 7, 8, 9) (p35).

Time	Topic	Content & Concepts	Suggested Activities: Investigations, Practical work, and Demonstrations	Equipment and Resources
I week	The national electricity supply system *[continued...]*	• Conserving Electricity in the home • South Africa has a limited supply of electrical energy • There are many different ways to use energy wisely and to save energy at home by turning off lights and appliances, using energy saving light bulbs, wearing warm clothing, stopping cold draughts, using energy efficient appliances, matching pot sizes to stove plate and using a "hotbox" for cooking	• Suggesting and writing about ways to converse energy in the home/school/ community • Discussing about careers in the field of electricity power generation (coal, nuclear, wind, water) including engineers, scientists (research), artisans, technicians [not for assessment purposes]	

Activity 6: Conserving electricity in the home

- Recap why it is necessary to save electricity.
- In pairs, get the learners to discuss the picture in the worksheet.
- Get feedback as a class.
- Get the learners to complete the worksheet on their own.
- Review the worksheet with the learners.

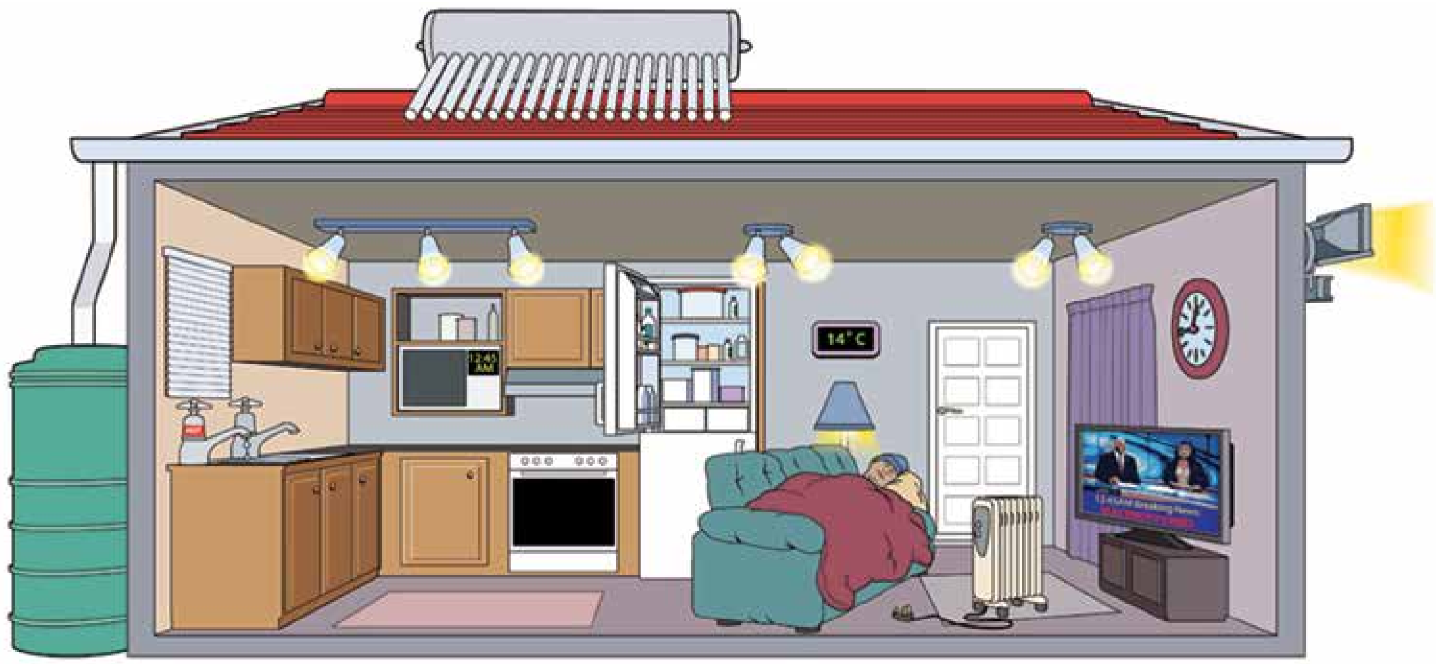
Notes:

- Electricity is scarce and expensive.
- South Africa has a limited supply of electrical energy
- There are many different ways to use energy wisely and to save energy at home like turning off lights and appliances, using energy-saving light bulbs, wearing warm clothing in winter instead of using the heater, stopping cold draughts, using energy-efficient appliances, matching the pot size to the stove plate and using a "hotbox" for cooking.

The wise use of electricity is a necessity. It is important that we recognise behaviour and correct practice of the unwise use of electricity. We need to also continue with behaviour that saves electricity.

Activity 7: Conserving electricity in the home

Study the picture and answer the questions.



1. Put a tick next to each appropriate behaviour on the picture and put a cross next to the inappropriate behaviour. Number each cross as 1,2,3…. [Refer to diagram]. [The learners should number their crosses in a different order – it's alright as long as the incorrect behaviour has been identified].

2. Explain why the behaviour is incorrect for each cross and state how the behaviour can be corrected.

No.	Practice that does not show energy-wise behaviour	No.	Correct behaviour
1.	Too many CFLs are on	1.	Keep only one CFL on
2.	Lamp is on.	2.	Switch the lamp off.
3.	Hot water tap is dripping.	3.	Close the tap or fix the tap if it is leaking.
4.	Door of the refrigerator is open.	4.	Close the door of the refrigerator immediately after use – do not leave it open for long.
5.	The microwave is on.	5.	Switch off if not in use.

2. What do you think is the attitude of the person in the picture towards the use of energy? [The person is not consistent in their use of energy].

3. What do you think is the attitude of the person in the picture towards the environment? [The person is aware of conservation of resources – there is a rainwater collection tank/the person is using solar energy for the geyser].

4. Write down the golden rule for using electricity wisely. [Switch it off if you are not using it].

5. Reflect how you are using electricity by looking at your own behaviour. Write down your incorrect behaviour and next to it the correct energy-wise behaviour. Put the correct behaviour into practice. This will help you to lead by example on how to use electricity wisely. [Acknowledge the responses of each learner].

Notes:

For more information on the schools programme, please visit www.eskom.co.za/idm.