

miniSASS



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This pack supports the Eco-Schools theme of 'Nature and Biodiversity'

Grade 5

This pack contains:

Activity One: During this MATHEMATICS lesson, learners look at the quantity of water used in their homes over a 24-hour period.

Activity Two: During this SOCIAL SCIENCES: GEOGRAPHY activity, learners look at rainfall distribution in South Africa, and indicate the major users of water in these regions.

Activity Three: During this TECHNOLOGY lesson, learners make a simple but effective water filter.

Activity Four: During these LANGUAGES activities, learners are introduced to the aquatic ecosystem. A word search is followed by a reading activity and comprehension.

Activity Five: During this LANGUAGES activity, learners are introduced to wetland birds, through a reading exercise and comprehension, followed by dictionary skills and a creative exercise.

Activity	Learning Area covered in this activity	Learning Outcomes covered in this activity	Assessment Standards covered in this activity
1. Learners look at the quantity of water used in their homes over a 24-hour period.	Mathematics	<p>Learning Outcome 4: Measurement: The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.</p> <p>Learning Outcome 5: Data Handling: The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.</p>	<ul style="list-style-type: none"> Solves problems involving selecting, calculating with and converting between appropriate S.I. units, integrating with appropriate contexts for Technology and Natural Sciences. Makes and uses simple data collection sheets that involve counting objects in order to collect data (alone and/or as a member of a group or team) to answer questions posed by the teacher and the class.
2. Learners look at the rainfall distribution in South Africa, and indicate the major users of water in these regions.	Social Sciences: Geography	<p>Learning Outcome 1: Geographical Enquiry: The learner will be able to use enquiry skills to investigate geographical and environmental concepts and processes.</p> <p>Learning Outcome 2: Geographical Knowledge and Understanding: The learner will be able to demonstrate geographical and environmental knowledge and understanding.</p>	<ul style="list-style-type: none"> Distinguishes between facts and opinions (works with sources). Identifies links between natural resources and economic activities in South Africa (people and resources). Describes ways in which the physical environment influences human activity and how human activity is influenced by the physical environment (people and the environment).
3. Learners make a simple effective water filter.	Technology	<p>Learning Outcome 1: Technological Processes and Skills: The learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies.</p>	<p>Makes:</p> <ul style="list-style-type: none"> Uses suitable tools and materials to make products by measuring, marking out, cutting or separating, shaping or forming, joining or combining, and finishing the chosen material. Works neatly and safely, ensuring minimum waste of material. <p>Evaluates:</p> <ul style="list-style-type: none"> Evaluates with assistance, the product according to the design brief and given specifications and constraints (e.g. people, purpose, environment), and suggests improvements and modifications if necessary.
4. Learners are introduced to the aquatic ecosystem.	Languages	<p>Learning Outcome 6: Language structure and use: The learner will know and be able to use the sounds, words and grammar of the language to create and interpret texts.</p>	<ul style="list-style-type: none"> Works with words: Records words in a personal dictionary.
5. Learners read about wetland birds and their survival adaptations, complete a comprehension on them, and make a poster about the importance of wetlands.	Languages	<p>Learning Outcome 1: Listening: The learner will be able to listen for information and enjoyment, and respond appropriately and critically in a wide range of situations.</p> <p>Learning Outcome 3: Reading and Viewing: The learner will be able to read and view for information and enjoyment, and respond critically to the aesthetic, cultural and emotional values in the text.</p>	<ul style="list-style-type: none"> Enjoys listening to different kinds of oral texts such as stories, myths, choral chants, jokes & riddles, and short plays and responds appropriately. Selects relevant reading material and applies research skills to find the information in dictionaries, reference books and textbooks from community sources or electronic media (where available).

ACTIVITY ONE: WATER IN THE HOME

During this MATHEMATICS activity, learners look at the quantity of water used in their homes over a 24-hour period.

ACTIVITY:

1. Take your class for a walk around the school. Show the learners where water meters can normally be found (on the verge, near the driveway, etc). Show the learners how to read a water meter. The pictures below show the two most common types of water meters used in South Africa.



Digital meter



Dial meter

2. Take the learners back to the classroom after they have seen the water meter and are able to read it correctly. Ask each learner to design a simple table, which will be used to record the amount of water used in their home. *An example of this table can be found below. This is not for the learners to use, but should give you, the teacher, an idea of what a record sheet should look like.*

Start Date				20/01/2009
End Date				21/01/2009
Meter reading at start				5022
Meter reading at end				5022.22
Activity	Time	Person	Amount of water used in litres (l)	Amount of water used in kilolitres (kl)
Bathing	7:05pm	Myself	200	0.2
Washing dishes	8:00pm	Mother	20	0.02
TOTAL WATER USED			220	0.22

Ask the learners to keep a record of water use in their homes for a single day, although it can be done for a longer period. The learners must convert their readings from litres (l) to kilolitres (kl). *One kilolitre = 1000 litres*. Learners should take readings before and after the major uses of water in their homes to get an idea of how much water each activity uses. The water meter reading must be entered into the table on the day that the project starts and ends.

3. Learners should total the amounts of water they have recorded in their tables. This total will be the amount of water that they have recorded being used in their house over a single day.
4. Get learners to subtract the meter reading at the start of this activity, from the meter reading at the end of this activity. This will be the amount of water that has been used over a day, which the learners can use to check their totals against.

AS A CLASS, DISCUSS:

1. Activities that use the most water in the home.
2. Ideas to lower the amount of water used in the home.

Criteria to assess learners during this mathematics lesson

Criteria	Exceeded requirements of the Learning Outcome	Satisfied requirements of the Learning Outcome	Partially satisfied the requirements of the Learning Outcome	Not satisfied requirements of the Learning Outcome
The learner made a simple record sheet to gather information about water usage in their homes.				
The learner used their record sheet to gather information about water usage in their homes.				
The learner correctly converted the S.I. units in the required calculations.				

ACTIVITY TWO: RAIN AND SOUTH AFRICA

During this SOCIAL SCIENCES: GEOGRAPHY activity, learners will look at rainfall distribution in South Africa, and indicate the major users of water in these regions.

READ THE FOLLOWING TO YOUR CLASS:

The human body consists of approximately 75% water and the longest that we are able to survive without water is 3 to 4 days. Water is one of the most valuable resources that we have on this planet. The surface of the earth is covered with water. However, most of this is salty and undrinkable. Only 2.5% of this water is fresh and of this, 99% is found in icebergs or underground lakes.

In South Africa, the main source of water is rainfall, which falls into river catchments, and is then stored in dams, and eventually flows into the oceans. The distribution of rainfall over South Africa is very uneven with the eastern portion receiving more than 850mm per year, while the extreme western region receives less than 100mm per year. For this reason, it is important that the catchments within this country are conserved, as they play a vital role in supplying clean water throughout the year. Catchments in good condition act like sponges, in that they slowly release clean water, and are still able to do so during a mild drought.

However, because of all the air pollution, the climate is changing. A basic definition of climate would be the weather in some location that has been averaged over a long period of time. This means that there may be more rainfall over some parts of South Africa, and less rainfall in other parts. People are very worried about this because they do not know if there will be enough rain in future to grow food, or fill dams. People think that there may be more rain over the eastern side of South Africa, and less over the western half of South Africa. This climate change may be slowed down if water and air pollution can be stopped or at least reduced. Unfortunately there has been too much damage done to stop this change altogether.

WHAT TO DO:

1. Hand out a copy of Worksheet 1 on page 5 to each learner.
2. Ask learners to colour in the rainfall map*. Use dark blue where there is lots of rain, and red where there is little or no rain.
3. Indicate what farmers grow in each province on your map.

** You will need to explain the rainfall pattern across South Africa, using the map and key on page 4.*

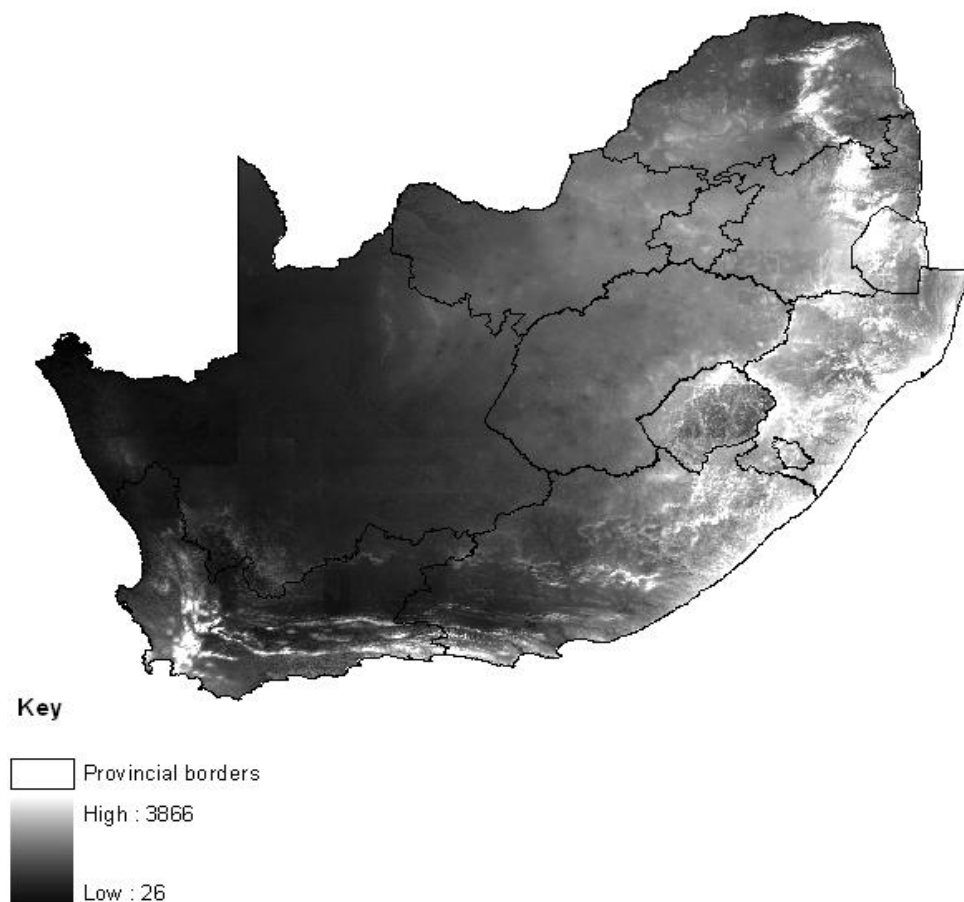
QUESTIONS TO ASK THE CLASS:

1. If you were a sugar cane farmer, where would you want to live to ensure that your sugar cane would be successful?
2. Which province in South Africa has the most rain?
3. What type of plants are found in the dry regions?
4. What type of plants are found in the wet regions?

5. What do you think are the main crops grown in each province?
6. Have you heard of the words “climate change”? If so, what is your understanding of these words?
7. What would happen to farmers if there was a long drought?

For question 3 of “What to do” and questions 1-6 of “Questions to ask the class”, it may be useful to have available a collection of library books on agriculture, farming and gardening in South Africa.

MAP OF RAINFALL IN SOUTH AFRICA



Those areas that are black receive very little rainfall while those areas that are white, receive much higher levels of rainfall.

WORKSHEET 1



Criteria to assess learners during this social sciences: geography lesson

Criteria	Exceeded requirements of the Learning Outcome	Satisfied requirements of the Learning Outcome	Partially satisfied the requirements of the Learning Outcome	Not satisfied requirements of the Learning Outcome
Learner was able to indicate the types of plants found in wet and dry regions.				
Learner knew where sugar cane would grow successfully.				
Learner grasped the concept of "climate change" and its possible implications				
Learner had an idea of what drought was, and what the implications of this phenomenon were.				

ACTIVITY THREE: MAKE A SIMPLE WATER FILTER

During this TECHNOLOGY activity, learners will make a simple water filter.

Read the following to the learners:

Water companies, like Umgeni Water in Pietermaritzburg, KwaZulu-Natal, pump water from dams or rivers, and then it is processed so that it is safe to drink. Filters form part of the cleaning process, and are used to remove fine particles from the water. Sand filters have been used for many years to remove dirt, and are still used in the filtration process today. Many swimming pool filter systems have sand filter systems. However, if the water is discoloured or has a foul (unpleasant) taste, then sand filters will not be able to remove the agents (chemicals, pollution) responsible for this. This is why chlorine and other chemicals are added to water.

Let's make our own water filter

Each learner will need:

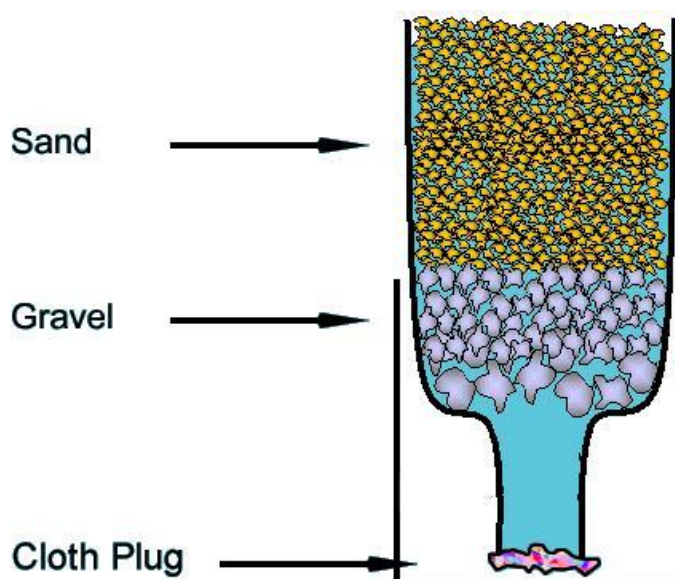
1. 1 two-litre plastic cooldrink bottle
2. A cloth plug
3. Pre-washed sand
4. Pre-washed gravel
5. Scissors

WHAT TO DO:

1. Cut the cooldrink bottle in two, about half-way up the bottle.
2. Place the top half in the bottom half so that it forms a funnel, that will drain the water into the bottom half.
3. Push the cloth plug into the end of the funnel. This will prevent sand and gravel running into the water collection container.
4. Place a layer of gravel in the funnel, over the cloth plug. It should be approximately 2cm thick to form an effective filter. *Layer thickness may vary according to the thoroughness of filtration required.*
5. Pour a layer of sand over the gravel. Ensure that the two do not mix too much, otherwise sand may come through the filter, and make the water dirtier than you started off with. This layer should be about 6 or 7cm thick to form an effective filter. *Again, layer thickness may vary.*
6. To test this filter, a variety of materials should be available to mix with the water. Use substances such as sand or dirt to test the effectiveness of the filter in the removal of solids. To show that the filter is unable to remove soluble substances, food colouring may be used.

*Teachers, ensure that learners **do not waste** the materials that they have been given. The learners should receive one plastic bottle and the correct amount of sand and gravel that is required for the gravel filter. They should also only receive one material plug.*

What your sand filter should look like



ASK THE CLASS:

1. Did their filters work well?
2. Could they have improved them? How?
3. What should they do to the water to make it safe for drinking after they have filtered it? *Adding chlorine to small amounts of water will make it toxic, so this is not an option. This water should be boiled to kill any germs.*
4. Why is it important not to waste the resources you are given?

Criteria to assess learners during this technology lesson

Criteria	Exceeded requirements of the Learning Outcome	Satisfied requirements of the Learning Outcome	Partially satisfied the requirements of the Learning Outcome	Not satisfied requirements of the Learning Outcome
Learner worked neatly and safely, ensuring minimum waste of material.				
Learner placed correct amount of gravel and sand in the funnel.				
Learner was able to evaluate the operation of their sand filter.				

ACTIVITY FOUR: WATER IS WONDERFUL!

During these **LANGUAGES** activities learners are introduced to the aquatic ecosystem. A word search is followed by a reading activity and comprehension.

WORD SEARCH:

In the block below, biotic (living organisms) water words are hidden. See how many you can find. There is a glossary at the bottom of this page. Use it to find out what these words mean.

A	M	J	G	F	F	E	R	T	H	J	K	H	Y	R
D	F	E	R	T	Y	H	F	S	E	H	N	G	R	E
S	V	E	R	T	E	B	R	A	T	E	Y	F	S	A
F	A	R	E	W	W	J	K	I	H	R	M	J	S	N
M	F	L	H	R	S	N	H	R	E	O	P	R	E	T
J	I	U	G	E	Q	A	E	E	R	N	H	T	D	M
N	S	H	R	A	E	E	S	T	F	G	H	T	G	R
H	H	R	E	W	E	C	N	C	H	E	R	Y	E	J
N	H	R	E	D	F	A	B	A	H	R	H	F	N	P
N	I	N	V	E	R	T	E	B	R	A	T	E	M	B
V	B	G	G	F	E	S	D	F	E	R	Y	I	H	G
V	F	M	O	L	L	U	S	C	C	D	R	X	F	E
V	G	D	R	R	E	R	E	D	N	H	N	M	H	G
V	F	R	F	H	Y	C	N	H	S	F	E	Y	H	J
N	S	D	A	V	F	R	E	D	S	A	D	C	F	E

Look carefully!
The words could be
horizontal, vertical,
diagonal, backwards or
forwards.

- | | |
|--|--|
| <ul style="list-style-type: none"> • Algae • Invertebrate • Crustacean • Bacteria • Mollus • Nymph | <ul style="list-style-type: none"> • Vertebrate • Fish • Heron • Frog • Sedge • Shrimp |
|--|--|

GLOSSARY

Algae – Simple plants, nearly all aquatic.

Invertebrate – An animal that does not have a spinal cord e.g. an insect.

Crustacean – Most aquatic animals that have a shell e.g. crabs, shrimps.

Bacteria – Micro-organisms (very small animals).

Mollusc – Invertebrate animals with soft unsegmented bodies, which normally have a shell, e.g. snails and clams

Nymph – A stage in the life cycle of certain animals e.g. dragonfly nymphs (*before they become dragonflies*).

Vertebrate – An animal that has a spinal cord e.g. fish.

Heron – Wading birds normally found in wetlands or along the edges of rivers.

Sedge – A coarse grasslike plant growing on wet ground.

Shrimp – A small shellfish with a long tail and a pair of pincers.

LIFE AT THE SURFACE

The surface of a river or pond divides two very different worlds. Beneath the surface the water is cool and wet, and while it provides support it is hard to swim through. It can also be murky and poor in life-giving oxygen. Above the surface the air can be hot and dry, and it provides little body support. However, it is often clear and always rich in oxygen. Most animals live their whole lives either under or above the water surface. However, a few species can move freely between the two, and for some the water surface is a good place to live.

Feathered floaters

Many birds swim and float about on the water and dive for food beneath the surface. Some, like coots, eat water-weeds, but ducks prefer water insects, and darters and pelicans feed on fish. Most water birds keep dry by having oily feathers that repel water. The feathers of darters and cormorants get wet when they dive, which is why you often see them spreading their wings out to dry in the sun.

The water walkers

One of the unusual properties of water is that it clings strongly to itself. Its surface is like a tough, elastic skin on which small animals can walk. The best known are the long-legged pond skaters. These insects have tiny fans of waxy hairs on their feet to stop them sinking. The middle pair of legs is used to 'row' across the surface as the pond skater hunts for floating insects.

Frogs have it all

Frogs and toads belong to a group called the amphibians. This word means 'both life' and refers to the fact that most tadpoles live and feed in water while the adult frogs live and feed on land. However, because frogs have a soft skin they have to return to water to wet their skins occasionally.

Double vision beetles

The whirligig beetle lives half in and half out of the water as it swims madly about hunting for fallen insects. The large eyes are divided – the top half looks up into the air, and the bottom half down underwater. If disturbed, it dives through the surface skin, carrying a bubble of air from which to breathe.

Spiders that fish

Most spiders make webs to catch flying insects, but fishing spiders can walk on the water surface. They 'angle' for small fish and tadpoles by dabbling the tips of their feet in the water as bait. When prey arrives, they quickly reach down to snatch it out of the water.



The surface restaurant

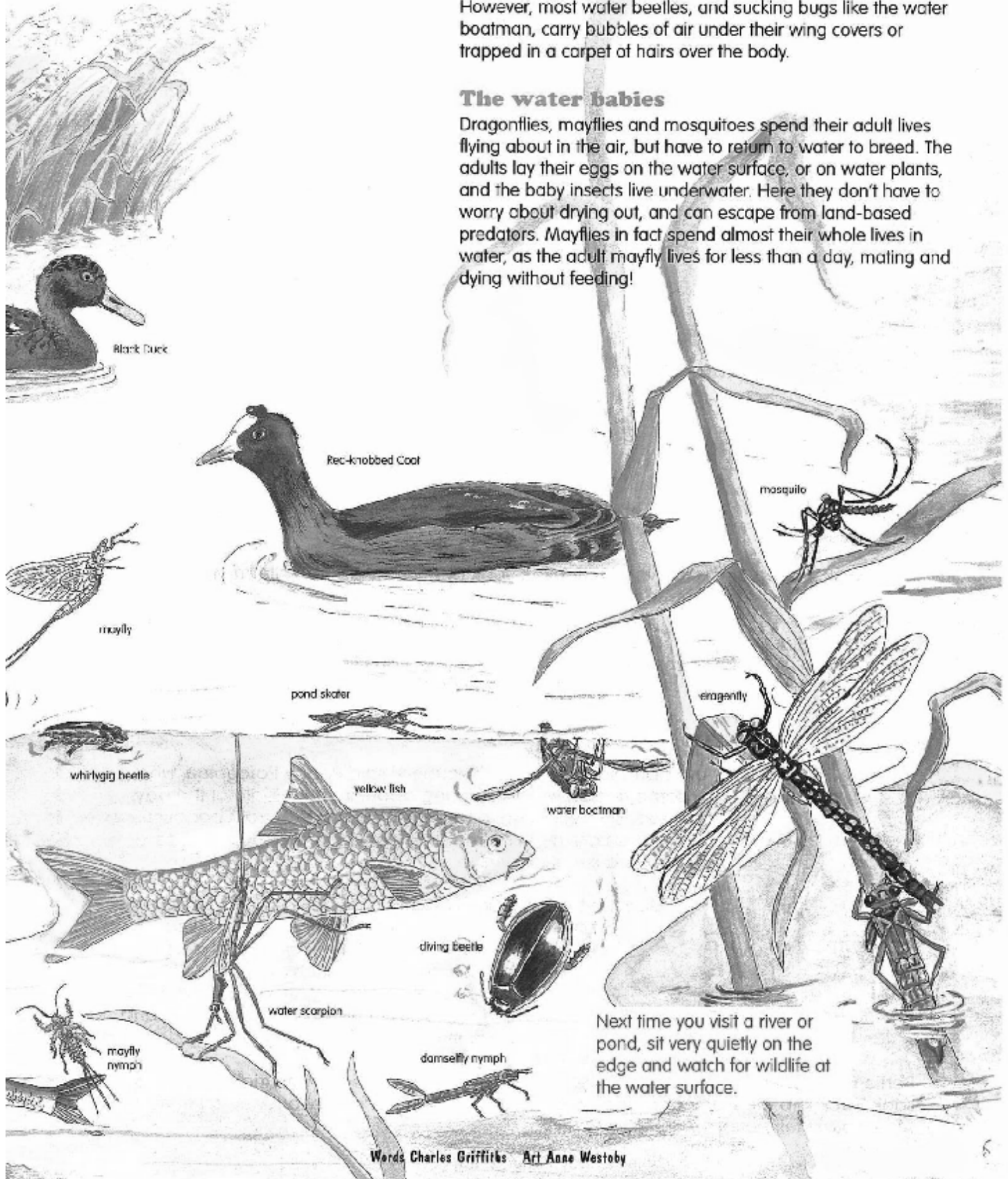
The sticky water surface traps many small insects that accidentally fall in. They make a rich source of food for fish that lie in wait for tasty morsels to float by overhead.

Snorkels and air bubbles

Many underwater insects need air to breathe. Some, like the water scorpion (a sucking bug) and the rat-tailed maggot (fly larva), have long tubes or 'snorkels' that reach to the surface so that they can remain underwater while breathing air. However, most water beetles, and sucking bugs like the water boatman, carry bubbles of air under their wing covers or trapped in a carpet of hairs over the body.

The water babies

Dragonflies, mayflies and mosquitoes spend their adult lives flying about in the air, but have to return to water to breed. The adults lay their eggs on the water surface, or on water plants, and the baby insects live underwater. Here they don't have to worry about drying out, and can escape from land-based predators. Mayflies in fact spend almost their whole lives in water, as the adult mayfly lives for less than a day, mating and dying without feeding!



Next time you visit a river or pond, sit very quietly on the edge and watch for wildlife at the water surface.

Words Charles Griffiths Art Anne Westoby

"Life at the Surface" has been reproduced from WESSA's *EnviroKids* magazine with permission.

The following questions are based on the article “**Life at the Surface**” on pages 10 and 11. Provide learners with copies of the article to read, before working through the following questions.

1. How does a water boatman breathe while under the water?
2. Although the dragonfly spends most of its time flying in the air, why do they need to be around water?
3. The whirlygig beetle is easy to identify in water as it moves and whirls very quickly on the surface of a pond or river. The eyes of the beetle are very special. Why is this so?
4. Fishing spiders don't make webs to catch their prey. How do they find their food?
5. The rat-tailed maggot lives in the oozing mud and slime on the bottom of ponds and rivers. There is not much oxygen in these conditions so how do they breathe?
6. How do you think a diving beetle would breathe under water?
Hint: to answer this question, think about its name.
7. To swim under water, what do human beings have to do to be able to breathe?

Criteria to assess learners during this languages lesson

Criteria	Exceeded requirements of the Learning Outcome	Satisfied requirements of the Learning Outcome	Partially satisfied the requirements of the Learning Outcome	Not satisfied requirements of the Learning Outcome
Learner is able to find all the words in the cross puzzle unassisted.				
Learner is able to answer questions about the natural system correctly.				
Learner understands the relationships in the article and what the article is about.				

ACTIVITY FIVE: KNOW YOUR WETLANDS BIRDS

During this LANGUAGES activity learners will be introduced to wetland birds, through a reading exercise and comprehension, followed by a creative exercise.

KNOW YOUR WETLAND BIRDS

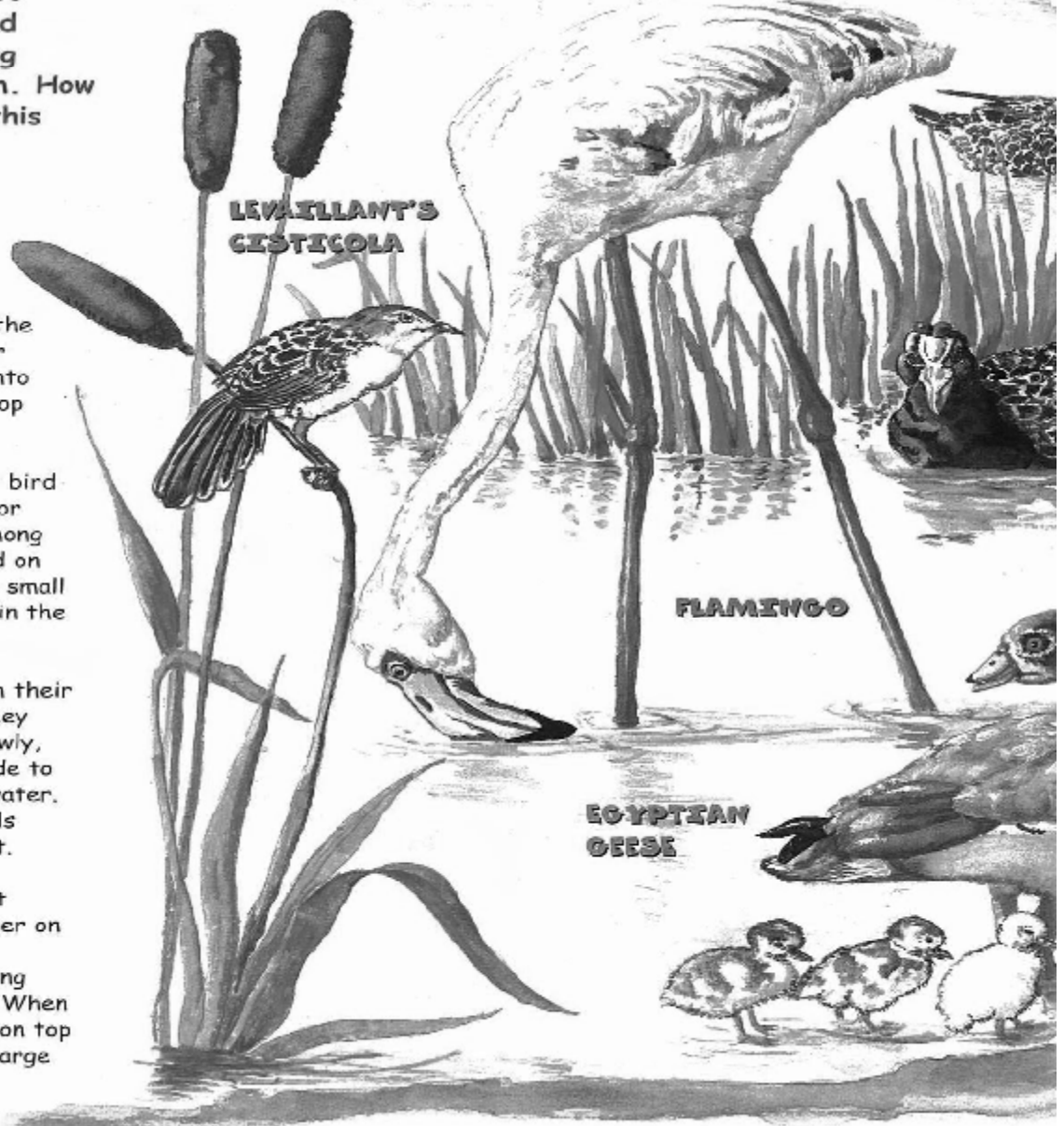
Wetlands are special places of high biodiversity (many different kinds of animals). They teem with life and play an important role in nature's water cycle. We need to appreciate and conserve our wetlands and one way to start is to visit one and learn about the amazing birds that inhabit them. How many of the birds on this page can you see in a wetland in your area?

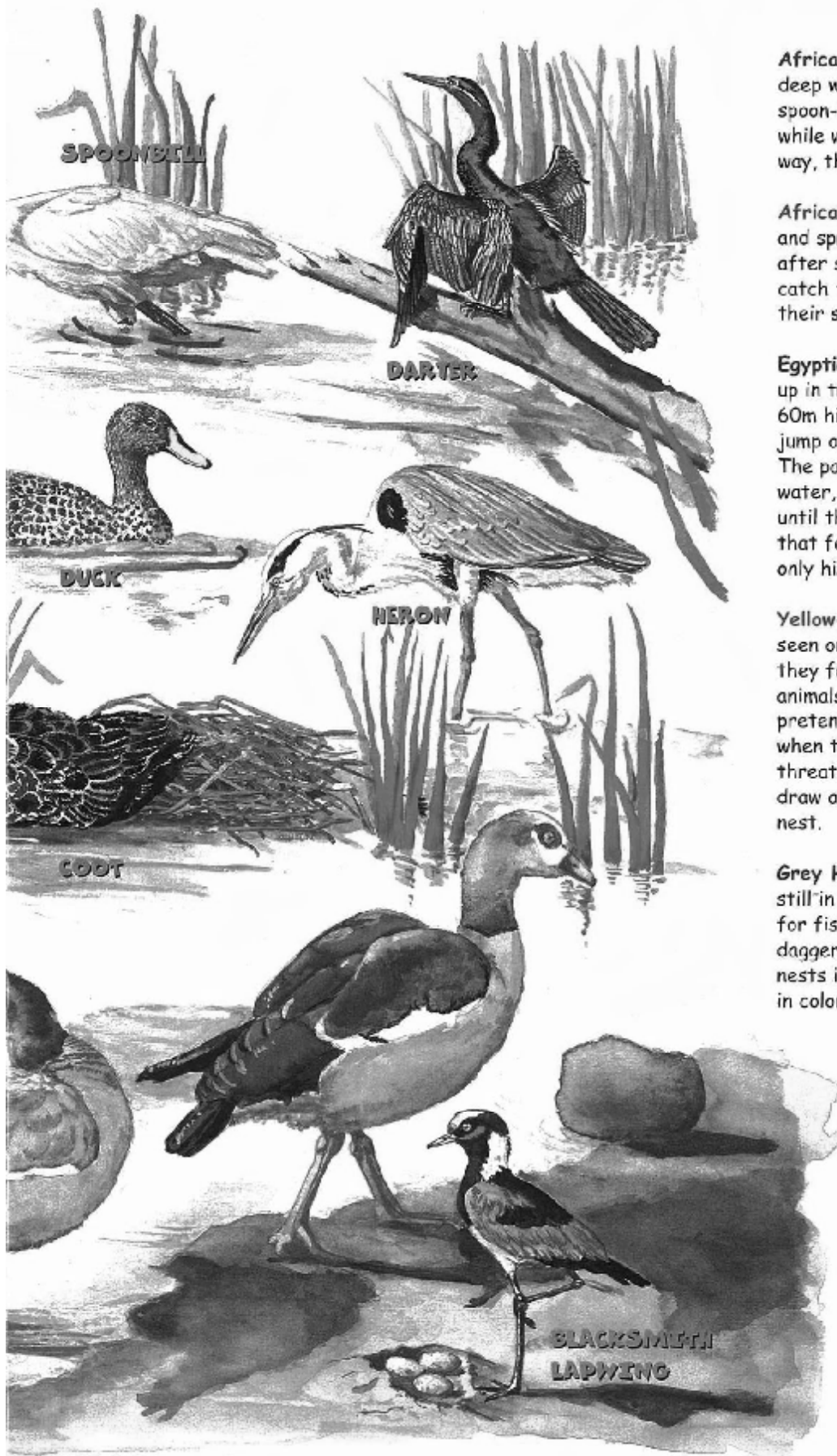
Eastern White Pelicans like to feed in large groups, forming a long line. They dip their bills into the water at the same time as they raise their wings. This chases the fish into the shallows, where they scoop them into their large bills.

Levaillant's Cisticola is what bird people call your typical LBJ, or little brown job. They live among reeds, and sing while perched on the top of reed stalks. Their small grass nests are hidden deep in the reeds.

Greater Flamingos wade with their heads held upside down as they feed. They move forward slowly, swinging their heads from side to side, sieving food from the water. They also stir up small animals from the mud with their feet.

Red-knobbed Coots are most often seen chasing one another on the water. They build floating nests, using large amounts of vegetation. When breeding, the two red knobs on top of their heads become very large and noticeable.





African Spoonbills feed in knee-deep water, sweeping their spoon-like bills from side to side while walking forward. In this way, they 'feel' for their food.

African Darters perch on trees and spread their wings to dry after swimming underwater to catch fish. They impale them on their sharp, pointy beaks.

Egyptian Geese often nest high up in trees or on cliffs – up to 60m high! The goslings have to jump off and drop to the ground. The parents then walk them to water, where they care for them until they grow up. Did you know that females honk while males only hiss?

Yellow-billed Ducks are often seen on dams and rivers, where they feed on water plants and animals such as insects. They pretend to have a broken wing when their nests or ducklings are threatened – they do this to draw attention away from the nest.

Grey Herons often stand very still in shallow water, watching for fish to spear with their dagger-like bills. They build large nests in trees and live together in colonies called heronries.

Blacksmith Lapwings (or Plovers) are easily recognised by their 'clink, clink, clink' call, which sounds like a blacksmith's hammer on an anvil. They nest on the ground and lay camouflaged eggs that are not easy to spot. When disturbed, they fly around calling loudly in an attempt to chase you away.

Words Sally van Zyl Art Anne Westoby

"Know Your Wetland Birds" has been reproduced from WESSA's EnviroKids magazine with permission.

READING AND COMPREHENSION SKILLS

1. What does the word “biodiversity” mean?
2. Describe how a flamingo collects its food.
3. In which species of bird does the male hiss?
4. Why has the Blacksmith Lapwing been given this name? What is a blacksmith?
5. The story gives examples of how different birds use their beaks to catch food. Give two examples of how they do this.
6. What is a LBJ and give an example of a bird which could be called a LBJ?

CREATIVE WORK

Make a poster to show people how important wetlands are and why we need to conserve them and the animals that live in them. Use magazines and books from your school or community library.

Remember not to put too much information on the poster. Concentrate on one or two main points.

Criteria to assess learners during this languages lesson

Criteria	Exceeded requirements of the Learning Outcome	Satisfied requirements of the Learning Outcome	Partially satisfied the requirements of the Learning Outcome	Not satisfied requirements of the Learning Outcome
Learner understands the vocabulary used in the text.				
Learner is able to answer the questions correctly without any significant assistance.				
Posters made are creative, and focus on one or two main points.				