ENVIRONMENTAL EDUCATION & AWARENESS PROGRAMME PLANNER

PROGRAMME TYPE (circle/cross): curriculum aligned X Off reserve

DETAILS

Name of school/ group	**N/A GRADE 5 CIRRICULUM PROGRAMME: PLANTS AND ANIMALS ON EARTH/ PLANET EARTH AND BEYOND**				
No learners/ participants expected	**Max 60**	No learners/participants actual	N/A	Programme length/duration	**1 hours (at schools/outreach)**
Location (reserve/site)	**On reserve**			Grade/age group	**Grade 5**
Is this part of the work plan?	N/A			If no, motivate why the programme is needed	Species conservation is a main awareness theme for CapeNature. The programme links to work done in the classroom and supports the curriculum.

CONTENT

	Theme (circle/cross)	Species Conservation
	Topics covered (e.g. water cycle/ importance of water)	**Plants and animals on earth. Different plants and animals (biodiversity), interdependence and soil types**
Know	Curriculum link (for curriculum aligned programmes only) – note subject/strand/topics (if not listed in topics above)	**Subject: Natural Science and Technology Grade 5** **Strand1: Life and Living (biodiversity, interdependence)** **Strand2: Planet Earth and beyond and Systems and Control (soil types)** **Subject: Life Skills Grade 5 – healthy eating and health and environmental responsibility.**
Do	Prior knowledge required (if applicable)	Not compulsory, but knowledge of the words biodiversity, habitats, particles, topsoil, dependence, food chains would be an advantage
	Skills practiced (cross/circle)	connect **explain identify label** list name (know)/ **analyse** assess categorise classify compare compile compose conduct construct create collect link **define** describe design develop **draw** find investigate listen make plan present **read** recognise record **report** represent dance sing sort summarise trace use senses **write count** (do)/ argue **commit** discuss motivate promise relate choose decide explain an answer persuade propose tell share
Value	Key message (e.g. we must save water)	We need to take care of our soil: Biodiversity our food, our health

GENERAL LOGISTICS

	Responsible person	Done (tick)	Status
Invite *			
Venue			
Transport			
Booking confirmed			
WCED permission *			
Presentation equipment & camera			
Risk assessment done, confirmation and checklist sent			
Catering *			
Indemnity *			

Other:

Plan requested by: _____ (name)

_____ (date)

Plan approved by: _____ (name)

_____ (date)

Budget and cost centre			

*If applicable

LESSON PLAN

Time	Location	Activity & explanation	Resources & person responsible for bringing/preparing the resource	Facilitating staff (if more than 1, indicate lead facilitator & timekeeper)
INTRODUCTION & ICEBREAKER				
2 min	Classroom	Introduce staff and briefly explain who CapeNature is	Presentation, laptop, projector	
2 min	Classroom	Give any house rules (any rules of engagement, bathrooms, conduct, safety briefing)	Presentation, laptop, projector	
1 min	Classroom	Give a brief programme outline	Presentation, laptop, projector	
10 mins	Classroom	Icebreaker and tuning in: Know: do a brief presentation on what Biodiversity is, teach that biodiversity is the variety of life. Explain that variety is important (many different plants and animals). Inform learners about Biodiversity Day. Do: Place the letters spelling BIODIVERSITY up on a wall in the classroom. Hold up a picture and ask the learners where that picture belongs (using the highlighted letter on the picture to match up with one of the letters in the word BIODIVERSITY. Once the group has decided, ask one learner to paste the picture up under the correct letter. Value: explain the value of diversity, link to soil and food	Plant and animal pictures (included, to be printed) Letters to spell BIODIVERSITY (not included) Prestik (not included) Presentation (included), laptop, projector (not included)	
BODY/ ACTIVITIES (very large groups, split and rotate)				
15 min	Classroom	**Soil types** Know (what to teach): 1) that rock becomes soil over time 2) there are different types of soil (sand/clay/loam) 3) topsoil is important and we must protect it Do: Learners must be divided into groups of approximately 5 learners per group. Each group must take a container (see through) with loamy soil and add water to it. They must then wait for the soil to settle and draw a picture of the soil layers. They should attempt to label it, but after discussion, it can be labelled as a team with the teachers help. (teach that loamy soil has sand, silt and clay particles and humus. It is the best soil for planting with) Value: Ask the group why they think conserving topsoil is important. This will lead into the interdependence section.	2l coke bottle for each group, water, paper to record findings on, loamy soil (not included) Presentation (included) laptop, projector (not included) Reference and resource material: Primary Science Programme Teachers Guide – Natural Science, Grade 5	
15 min	Classroom	**Interdependence** Know (what to teach): 1) plants and animals need resources such as water, soil, food (other plants and animals), places to shelter etc. 2) this is called interdependence Do: Divide learners into groups of approximately 5. Each group should receive a Living soil poster (with words blackened out) and a set of the	A3 living soil posters for groups (included – to be printed, copied), prestick (not included), labels for group (included, to be printed, cut, copied) Presentation (included), laptop, projector (not included)	

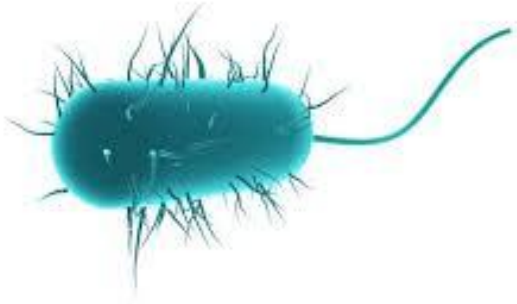
		words with prestick. Learners must match the words to the pictures and learn about interdependence in context of soil. Value: Ask the group how we are dependent on soil and why we must protect it		
CONSOLIDATION & EVALUATION				
10 min	Classroom	**Consolidation** Do/know: Ask learners to complete two sentences about the day and record this on the chalkboard or a flipchart for learners to see. Today I learned … Soil is important because…… Know: Discuss with learners what they can do to protect soil Value: Ask learners to pledge one thing to do differently after the lesson (You can make them write their pledge and stick it up with prestick in the classroom as a reminder)	Paper for pledges (optional, not included) Presentation (included), laptop, projector (not included) Chalk or flipchart paper and cocci (not included)	
5 min	Classroom	Thank the venue, group leaders and relevant parties and emphasise the key message once more. Ask teachers to complete an evaluation.	Evaluation forms (not included)	

Acknowledgement

Primary Science Programme (PSP), **, www.psp.org.za**

BIODIVERSITY PICTURE GAME

B – Bacteria



I – Ibis (Hadeda)

O – Olive tree (wild)

D – Dung beetle

I – Insects

V – Vlei rat

E – Eel worm

R – Rock hyrax (dassie)

S – Snake

I - Impala

T – Termites

Y – Yellow wood tree

SOIL TYPES

Reference : Primary Science Programme – Teachers Guide – Natural Science – Matter and Materials – Grade 5
Background information

Consolidation

Learner Task Card 4 to photocopy on page 56

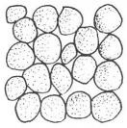
LEARNER TASK

Activity: How rocks break into grains by weathering

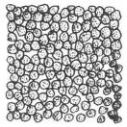
1. Draw a series of diagrams to show how a rock wears down into smaller pieces and grains over thousands of years.
2. Show how heat, cold, wind and rain can break a rock down into small pieces and grains.
3. Write a sentence below each drawing to explain what is happening. Use the word list below to help you.

WORD LIST
rocks, wind, water or rain, crack, break, heat, cold, stones, smaller, particles, grains

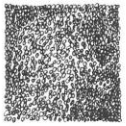
Sand
- large particles (grains)
- large air spaces in between the particles (grains)



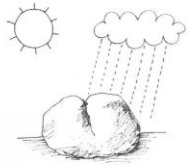
Silt
- smaller grains than sand, bigger than clay
- smaller air spaces between the grains



Clay
- smallest grains
- very small spaces between the grains.



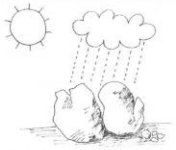
Rock today



Heat, cold and rain crack the rocks.

Time

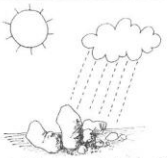
The rock 100 years from today



Water and wind break it down into smaller stones.

Time

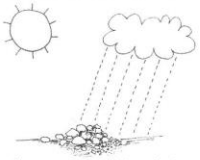
The rock 1 000 years from today



Water and wind break the rock and stones down even more.

Time

The rock 100 000 years from today



Eventually the rock will break down into smaller grains.

3 Soil types

Activity: What type of particles does loamy soil have?

TEACHER TASK

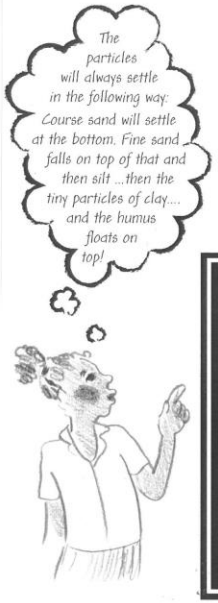
Introduction

Explain

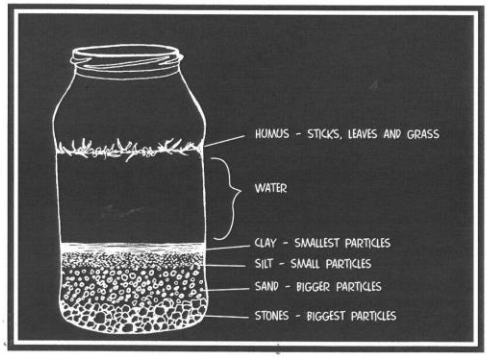
1. Soil is usually a natural mixture of different types of rock particles. The type of soil depends on the proportions of the different particles in it.
   - **Sandy soil** has a high proportion of coarse sand particles (grains).
   - **Clayey soil** has a high proportion of fine clay particles.
   - **Loamy soil** has a mixture of sand, silt and clay particles, and it also contains humus.
2. We can find out what kind of particles make up the soil by stirring it up in some water. Then we can analyse the soil because the different particles settle out into layers.

Preparation

1. Provide the following equipment for learners in groups.
   - 1 cup of loamy soil
   - 1 big coffee bottle with lid
   - water to fill up the bottle
2. Learners must mix their soil with water in the coffee jar, and let it stand for the particles to settle.
3. Afterwards, they must draw a picture on the chalkboard showing the different layers. Explain that this allows us to see the different particles that make up our soil, because they have separated into layers. We can also see how much of each kind of particle we have by the thickness of the layer.



- The biggest particles such as coarse sand and stones are the first to settle at the bottom.
- Fine sand particles settle next.
- Smaller particles of silt are the next to settle down.
- The smallest particles (clay) stay suspended (hanging) in the water for some time before they settle in the next layer. The clay usually makes the water look muddy.
- The humus (pieces of rotting plants) floats to the top of the water.
- Soil is a mixture of particles, which settle into layers when they are mixed with water. The constituents of soil always settle in the same order (as shown in the drawing below).



Why is loamy soil best for planting?

The best kind of soil for planting is called loamy soil.

- Loamy soil is a mixture of sand, silt and clay.
- Loamy soil also contains humus.

TEACHER INFORMATION

Proportions of loamy soil mixture:

Clay: 8–28%
Silt: 28–50%
Sand: 25–52%

Farmers plant their crops in loamy soil.

The different particles that make up the soil give the soil its properties.

The clay particles hold the water so that the soil never dries out completely. The sand particles allow excess water to drain out of the soil because they have spaces between them for the water to run through. The spaces also trap air in the soil and make it light and soft. The clay, silt and rotting humus contain mineral salts (essential chemicals), which help plants to grow well.

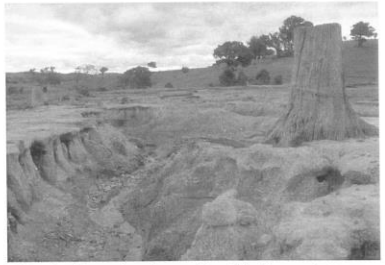
Good soil feels soft and light because of the air between the particles. It contains humus and has very small organisms living in it.

Protecting our good topsoil

All soils form very slowly in nature. Once topsoil is lost it cannot be replaced easily and so we need to look after the soil, keep it in place and feed it with humus to keep it fertile.

We find different soils in different places

Soil from one area can be very different to soil from another. For example, soil from Khayelitsha contains mostly sand because the town is built on a sand dune. This means that you will not find a layer of clay when you analyse that soil. The layer of silt will also be very thin.



Soil erosion donga where the good topsoil has been washed away.

Soils that have a large proportion of sand are called sandy soils.

Other soils may contain mostly clay. They are called clayey soils. Other soils near river flood plains may contain a lot of silt.

Soil is considered a 'poor' soil when it does not contain a good mixture of all three particles. People struggle to grow plants if the soil is poor. That is why they add compost and fertiliser to enrich the soil.

It is difficult to grow food where the soil is very sandy.

Compost can be added to enrich poor soil.

Consolidation

Questions

1. What is loamy soil?
   Loamy soil has sand, silt and clay particles in it and also humus. It is the best kind of soil for planting.
2. Why is it the best kind of soil for growing things?
   Loamy soil is good soil for growing things because it has sand, clay and silt in it and also humus. This makes it fertile soil and the humus helps to keep the soil damp for plants to grow. Other organisms such as earthworms like to live in loamy soil.
3. Why must we look after our soil?
   We must look after our soil because all food needs good soil to grow in. Soil can be washed away easily and it will take a very long time to form again.

NOTE TO THE TEACHER

How to do shared writing with your learners

- Learners tell the teacher what to write about the soil analysis using full sentences.
- Teacher captures the ideas on the chalkboard in the words of the learners.
- After each sentence is written, learners read the text aloud with the teacher.
- When the paragraph or text is complete, the learners help the teacher to edit the paragraph. Make sure of the following: there is a topic sentence; sentences are in a logical order, information is correct; grammar, spelling and punctuation is correct.
- The corrected paragraph is written up on the board. Learners read it aloud once more.
- Learners copy it into their science books.

Shared writing

Assist learners to write a few sentences about the soil analysis, for example:

Analysing loamy soil

First I mixed a cup of soil with water.

After that the soil settled.

I could see five layers of particles.

The small stones and bigger sand particles settled to the bottom layer. They are the biggest and heaviest particles.

The next layer to settle was the sand particles. Sand particles are smaller than stones.

The next layer to settle was silt particles. They are smaller than sand particles.

The next layer to settle was clay particles. Clay particles are the smallest particles. Clay makes the water look muddy.

Finally the sticks, leaves and grass float to the surface. The sticks, leaves and grass are called humus.

Activity: Comparing two different samples of topsoil

TEACHER TASK

Preparation

Provide two very different soil samples from different places for the learners to do the following task. We want the learners to see that soils from different places will have different proportions of the three particles.

INTERDEPENDENCE

Background information

2 Inter-dependence

TEACHER TASK

KEY CONCEPTS

- Plants and animals depend on each other
- They also depend on the resources available in their own habitats.

Introduction

Explain and ask learners:

- Can you survive without other people?
- Could you have survived from babyhood without other people?
- What did other people do for you?
- Can you survive now without other people?
- Can you survive without plants and animals? (Remember even worms and flies are useful to our survival. Flies break down waste and earthworms help to enrich our soil.)

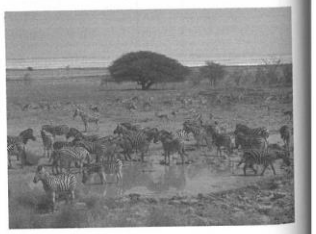
But we don't only need people. What else do we need? What other plants and animals do we need for our survival? (Think of where our eggs and milk, bread, cereals and meat come from.)

What do you think would happen to the Earth and to us if there were not so many different plants and animals?

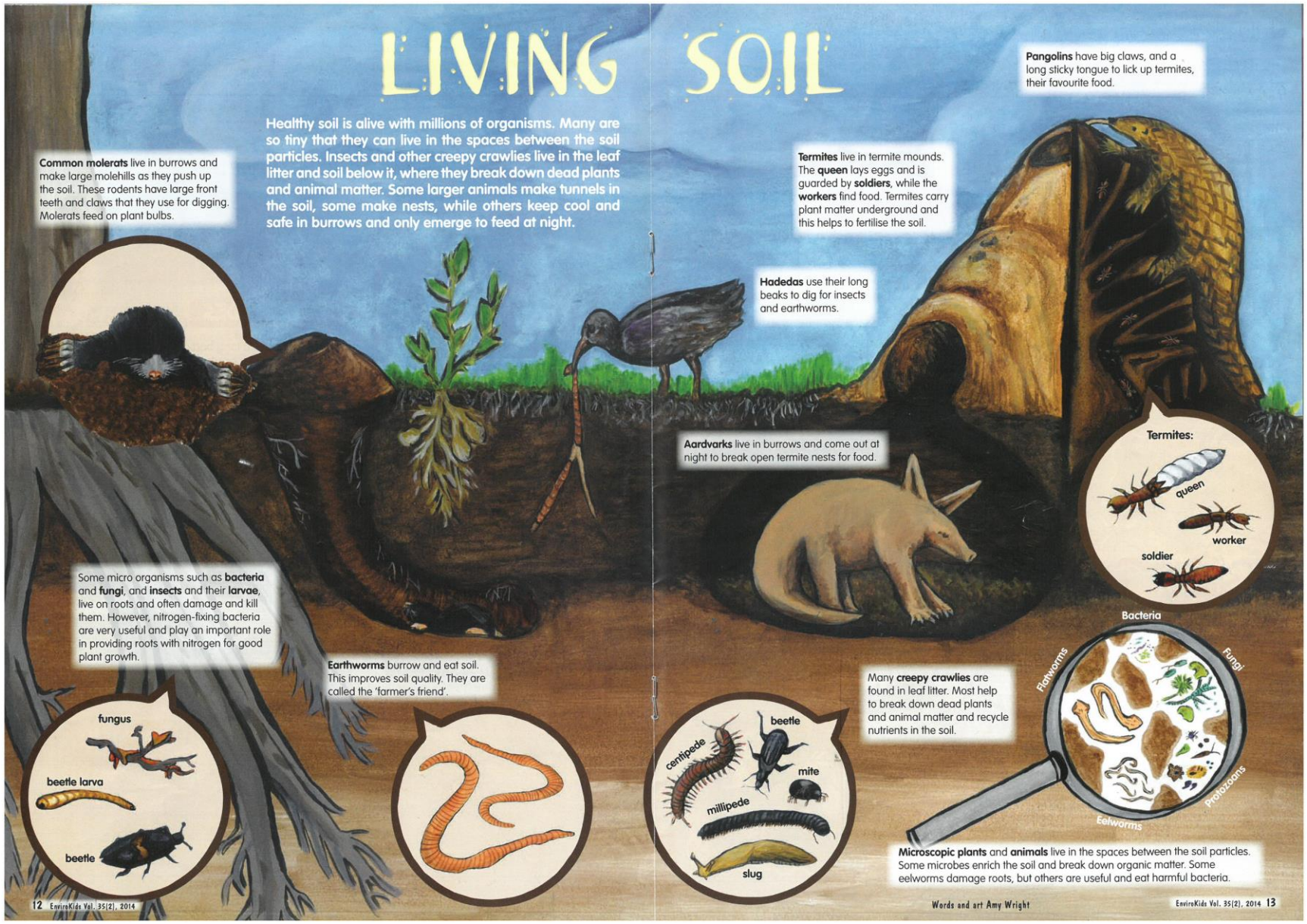
Plants, animals and people are interdependent. This means we all depend on each other for our survival.

Teach the following

- All animals depend on plants for their food. Plants produce food for themselves and animals. We all need a variety of plants and animals to survive.
- All plants and animals, and also people, depend on the resources available in their own habitats.
- Plants and animals need resources such as:
  water; energy (like sunlight); soil; food and places where they can find shelter from the weather, bring up their babies and be safe.



Living Soil master poster with answers – Reference Envirokids



LIVING SOIL

Healthy soil is alive with millions of organisms. Many are so tiny that they can live in the spaces between the soil particles. Insects and other creepy crawlies live in the leaf litter and soil below it, where they break down dead plants and animal matter. Some larger animals make tunnels in the soil, some make nests, while others keep cool and safe in burrows and only emerge to feed at night.

Words and art Amy Wright

Words to copy and cut out

Common molerats live in burrows and make large molehills as they push up the soil. These rodents have large front teeth and claws that they use for digging. Molerats feed on plant bulbs.

Pangolins have big claws, and a long sticky tongue to lick up termites, their favourite food.

Many **creepy crawlies** are found in leaf litter. Most help to break down dead plants and animal matter and recycle nutrients in the soil.

Earthworms burrow and eat soil. This improves soil quality. They are called the 'farmer's friend'.

Some micro organisms such as **bacteria** and **fungi**, and **insects** and their **larvae**, live on roots and often damage and kill them. However, nitrogen-fixing bacteria are very useful and play an important role in providing roots with nitrogen for good plant growth.

Termites live in termite mounds. The **queen** lays eggs and is guarded by **soldiers**, while the **workers** find food. Termites carry plant matter underground and this helps to fertilise the soil.

Hadedas use their long beaks to dig for insects and earthworms.

Aardvarks live in burrows and come out at night to break open termite nests for food.

Microscopic plants and **animals** live in the spaces between the soil particles. Some microbes enrich the soil and break down organic matter. Some eelworms damage roots, but others are useful and eat harmful bacteria.

Additional information on soil – Reference Envrokids

LIFE IN THE SOIL

Soil is a difficult place in which to live. It is hard to move through, completely dark, and the water and oxygen supply can vary widely. On the other hand, the benefits are that the temperature stays fairly constant, and being underground is a good place to hide from predators. Soil animals play important roles in aerating and enriching soil with nutrients. Let's look at how some common soil animals cope with life in this habitat.

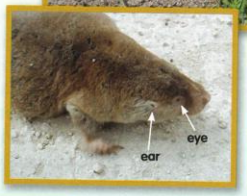
MOLES

Golden mole ►

There are two types of moles. **Golden moles** are small and push up long tunnels just below the soil surface. They have small teeth, no visible eyes or tails, and the strong front legs are short and have huge claws for digging. The flattened leathery nose is used to push through the soil. Golden moles feed mainly on insects and earthworms.

Mole rats are much bigger animals and have large front teeth, visible eyes and ears and short tails. They use their teeth for digging, while their feet shovel the loosened soil aside and backwards. The soil is then pushed up into large molehills. Mole rats eat roots, bulbs and tubers in the soil.

Mole rat ►



EARTHWORMS

Earthworms are very important soil animals that prefer damp conditions. They have long, muscular, segmented bodies and each body segment has several pairs of short hairs for gripping the tunnel wall as the head is pushed forward. They make burrows by eating the soil, and feed on moist leaf litter. Earthworm activities both aerate and fertilise the soil, and they are an important food for birds and moles.

MOLE CRICKETS

Mole crickets are large insects, with a furry abdomen and tube-shaped body. They dig long burrows just beneath the surface of moist soils and feed on plant roots. The powerful front legs are short and have spade-shaped claws for digging rapidly though the soil.

WOODLICE

Woodlice are most active at night. Some species, called pillbugs, are able to roll up into a tight ball to protect themselves against predators and from drying out. Woodlice often occur in large numbers, and eat decaying plant and animal matter. They are one of the most important animals for turning plant matter into compost.

GROUND BEETLES

Ground beetle ►

Many kinds of beetles and their larvae live in soil and leaf litter and feed on a variety of plant and animal matter. Adult beetles that burrow, usually have smooth, round, shiny bodies for slipping through soil and plant litter. Their strong legs have flattened, spade-shaped feet for digging, and the head often ends in a flattened plough-shaped plate for pushing soil aside. Dung beetles are well known for cleaning up and burying dung balls in which they lay their eggs. By burying dung, the beetles enrich the soil with organic matter.

◄ Dung beetle

MILLIPEDES

Millipedes have a long body made up of many segments, each covered with hard, smooth armour. The head is bullet-shaped for bulldozing through the soil. Each body segment has two pairs of short legs that give a powerful but slow push through soil and leaf litter. Millipedes break down dead plant matter and eat it.

ANT LIONS

Ant lion larvae are better known than their dragonfly-like adult forms. The drab, fat larvae dig cone-shaped pits in dry soil. They do this by turning around in a circle while flicking soil upwards with their heads. Next, they bury themselves at the bottom of the pit and lie in wait. When an insect falls into the pit, the larva uses its large, curved claws to grab the insect and suck the juices from it. The larva then tosses the empty skeleton out of the pit.

▲ Ant lion larva

SPRINGTAILS, MITES AND OTHER TINY CREATURES

There are many tiny creatures that are so small that they can live in, and move though, the gaps between the soil grains. Springtails, mites and pseudoscorpions often occur in very large numbers. They eat a wide range of organic matter and some prey on other tiny creatures.

Mites ►

▲ Pseudoscorpion

▲ Springtails

SEE PAGE 23 FOR FUN WITH SOIL

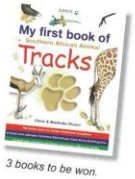
Words and photos Roberta and Charles Griffiths

Additional activities you can give to teacher for after or use to extend the programme – reference Envirokids

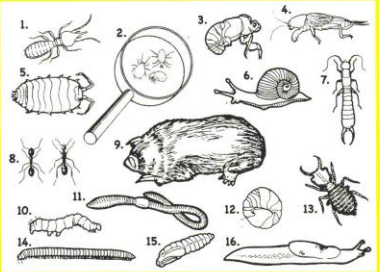
PUZZLES

NAME THE SOIL ANIMALS

The picture shows some of the animals that live in soil. Match the numbers on the pictures to the animal names below.



3 books to be won.

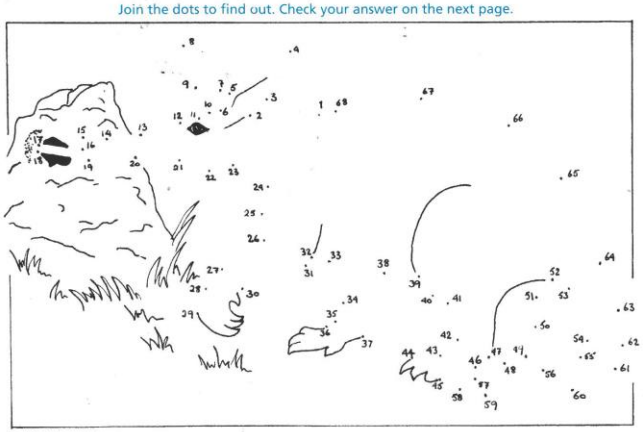


List your answers on a sheet of paper and attach it to a completed copy of the competition entry form on the next page. Send it to *EnviroKids* and you could be one of our winners!

ANT
ANTLION LARVA
CATERPILLAR
CICADA NYMPH
EARTHWORM
EARWIG
INSECT PUPA
MILLIPEDE
MITES
MOLE
MOLE CRICKET
PILL MILLIPEDE
SLUG
SNAIL
TERMITE
WOODLOUSE

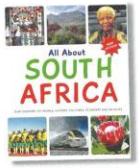
WHO IS HIDING IN THE PICTURE?

Join the dots to find out. Check your answer on the next page.



SOIL WORD SEARCH

Find all the words below and then look for the unused letters that will tell you what helps to keep soil healthy. Some letters are used more than once and words can go in any direction, but always in a straight line.



3 books to be won.

E	D	E	P	I	L	L	I	M	C
D	C	E	F	I	L	I	O	S	A
S	A	O	H	T	R	A	E	I	T
K	M	R	M	R	O	T	R	T	E
F	C	R	K	P	I	★	R	O	R
D	O	O	O	M	O	I	T	O	P
N	W	O	R	W	D	S	W	R	I
A	E	E	D	E	H	O	T	T	L
S	T	N	E	I	R	T	U	N	L
N	U	S	★	G	S	F	R	A	A
C	L	A	Y	E	L	O	M	A	R
D	I	G	N	O	I	S	O	R	E

Send the missing word and a completed copy of the entry form to *EnviroKids* and you could win a prize.

AIR ANT CATERPILLAR
CLAY DARK DIG DIRT
EARTH EARTHWORMS
EROSION FOOD GROW
LIFE MILLIPEDE MOLE
NEST NUTRIENTS ROCK
ROOT ROT SAND
SEED SOFT SOIL SUN
TERMITES TOP WET

ANSWER: An aardvark is hiding in the picture.

PRIZE-WINNERS FROM *ENVIROKIDS* VOL. 35(1) HEALTHY RIVERS HEALTHY PEOPLE

In order to allow enough time for readers to enter competitions, the winner's names will be printed in the next issue.

Competition Entry Form. Copy, fill it in and send to *EnviroKids*, P.O. Box 30145, Tokai, 7966.
Competition deadline 30 July 2014.

Name ..... ☎ (code) ..... Age ....
Postal Address: .....
Code: ..... E-mail: ..... Are you a WESSA member? YES ☐ NO ☐
What are your 4 favourite pages in this issue? Page numbers .....
What would you like to read about in *EnviroKids*? .....

NOTE: Each entry must have a completed copy of the entry form attached. Providing an e-mail address helps us to inform you of the parcel tracking number if you are a winner. Send all entries in one envelope to save stamps and paper. Competitions are open to all children of 15 years and under.

Puzzles Roberta Griffiths