



Twenty years of nurturing nature for you

TEACHERS WORKSHOP –

Natural Science and Technology Grade 5

Strand2: Planet Earth and beyond and

**Systems and Control (the surface of the
Earth)**

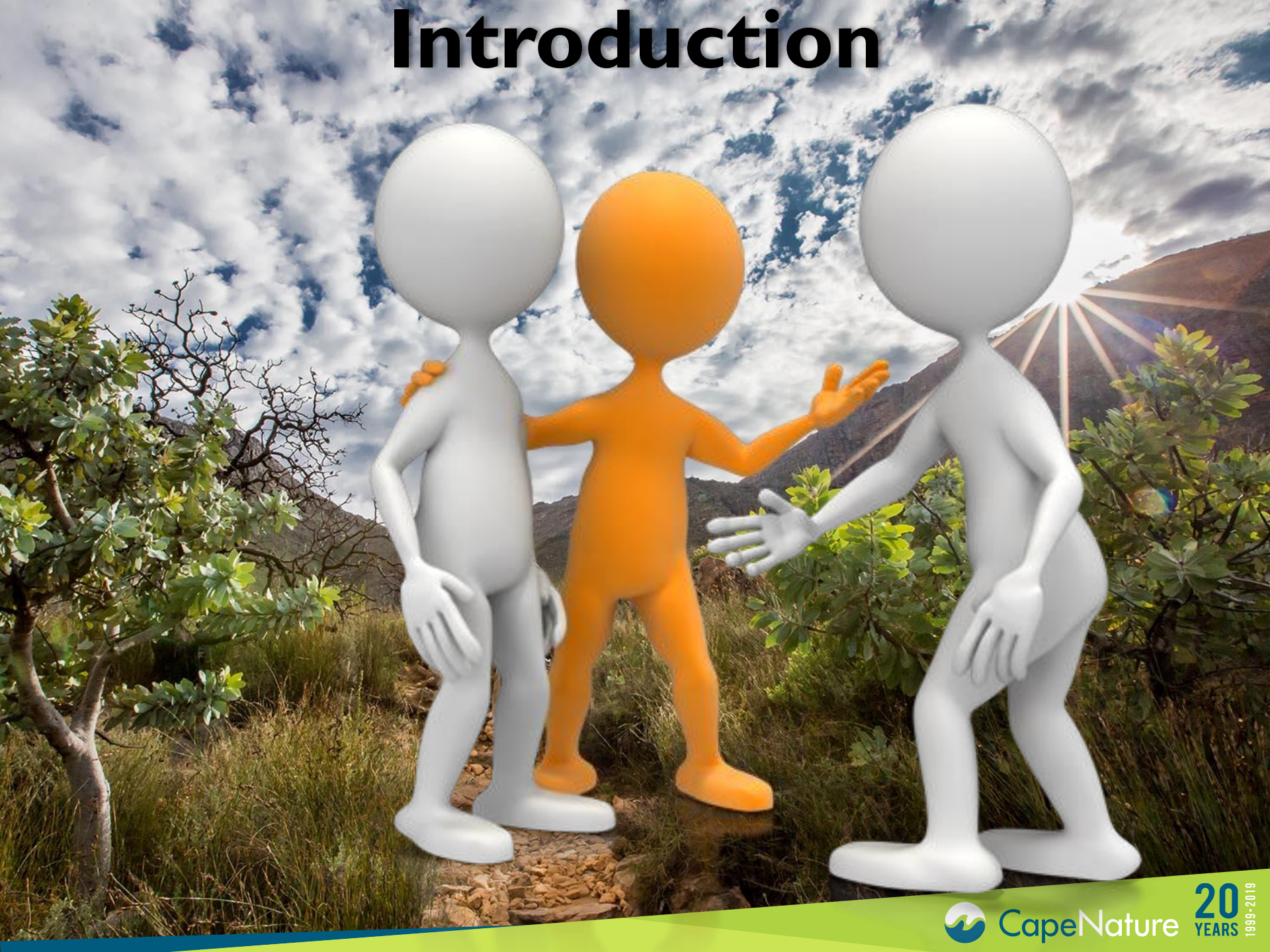
*** Rocks**

*** Soil types**

ADD TITLE

XXX

Introduction



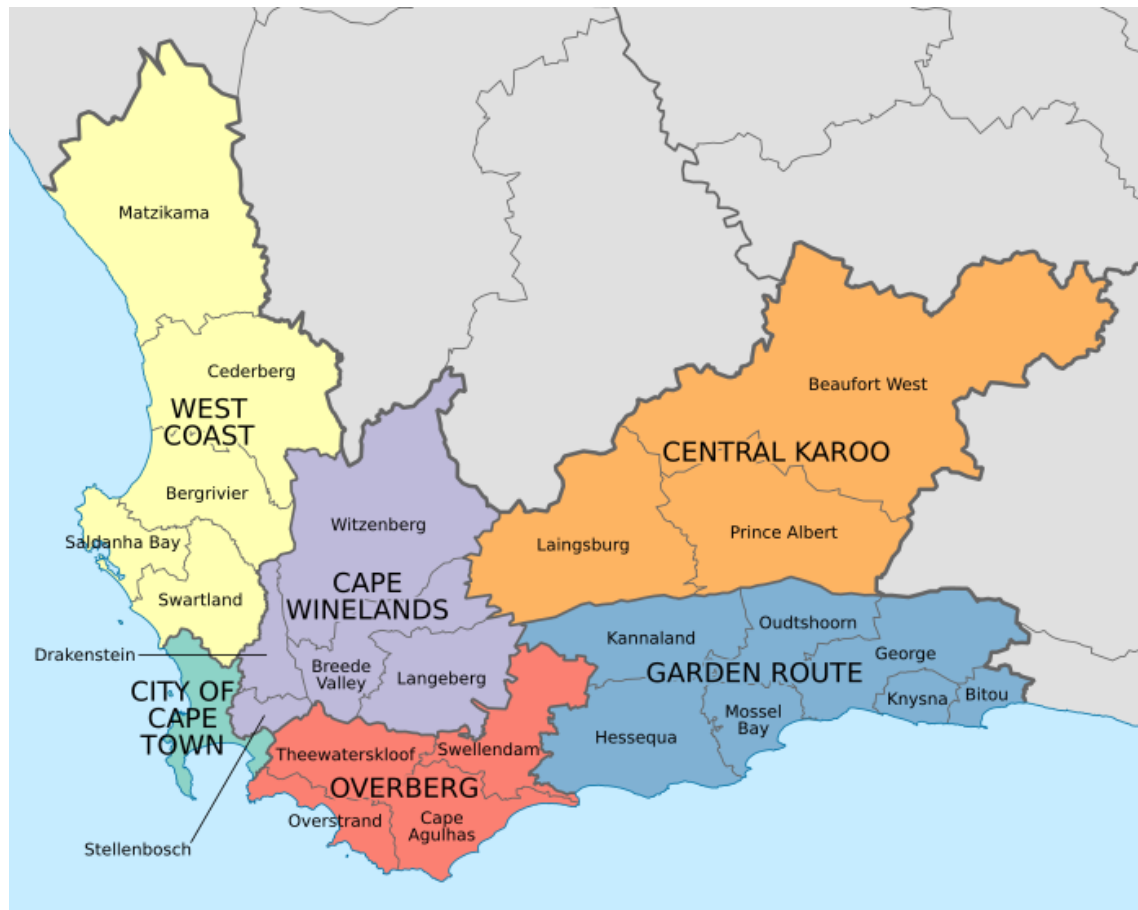
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Who are we?



CapeNature is the conservation authority tasked with the protection of biodiversity in the Western Cape.



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Programme outline

- 15 min Introduction and icebreakers
- 45 min Rocks
- 45 min Soil types
- 15 min Consolidation and the way forward

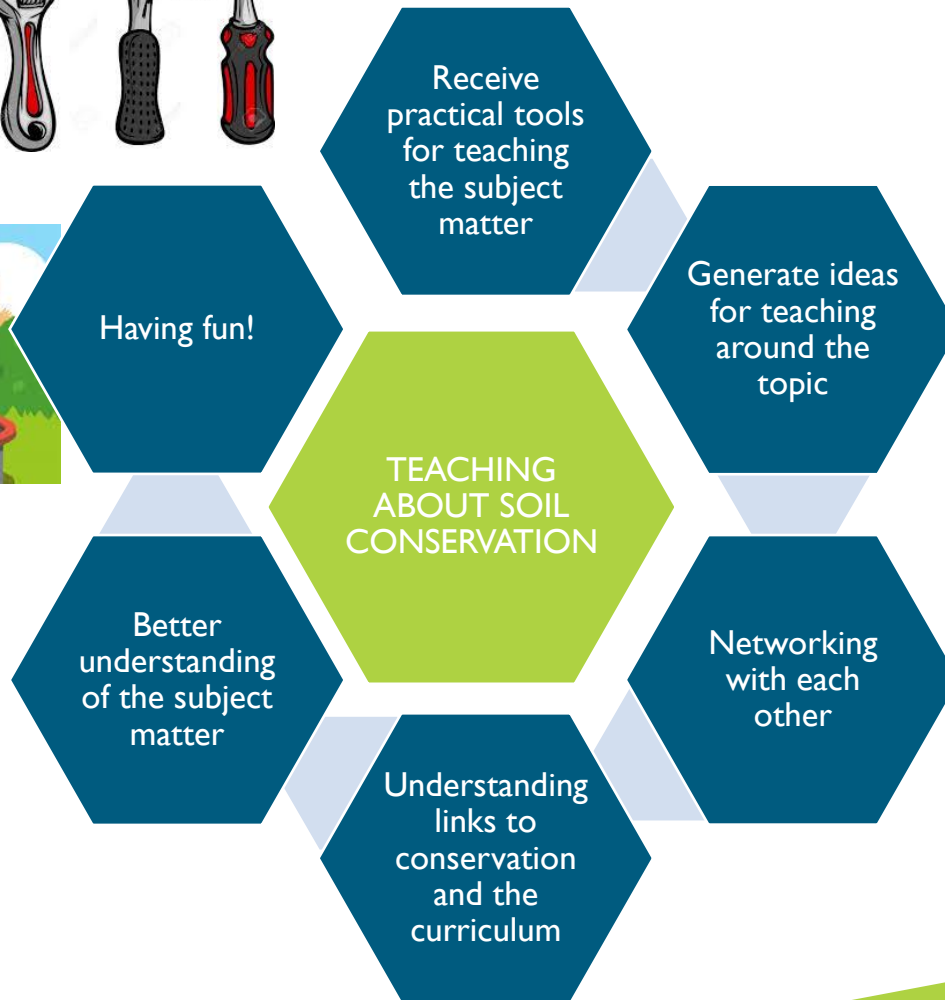


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What are outcomes for today?





Activity: who is who in the zoo

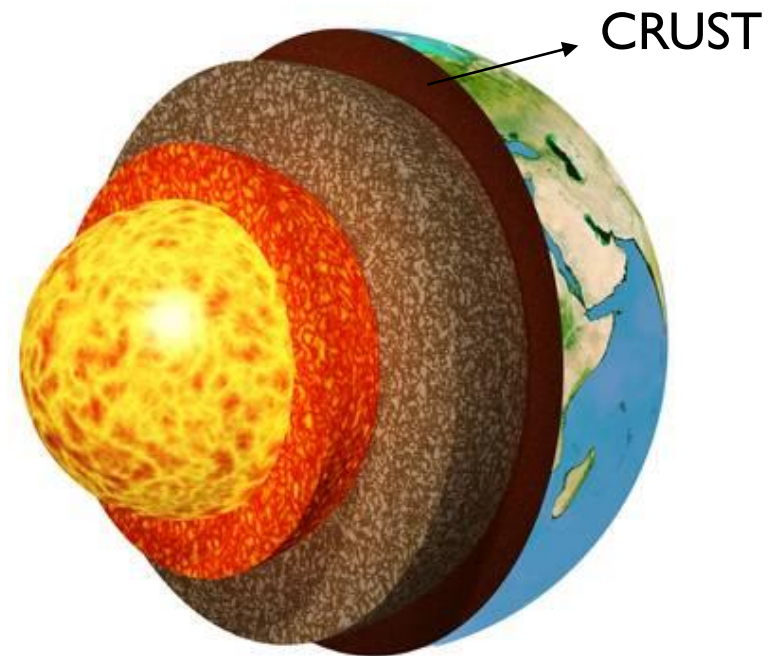
Rocks



Introducing rocks and soil- tuning in



- Earth is made of rocks
- Earth is hard on the outside and soft on the inside



KEY CONCEPTS

The surface of the Earth is called the crust

Soil, air, water and sunlight support life on earth



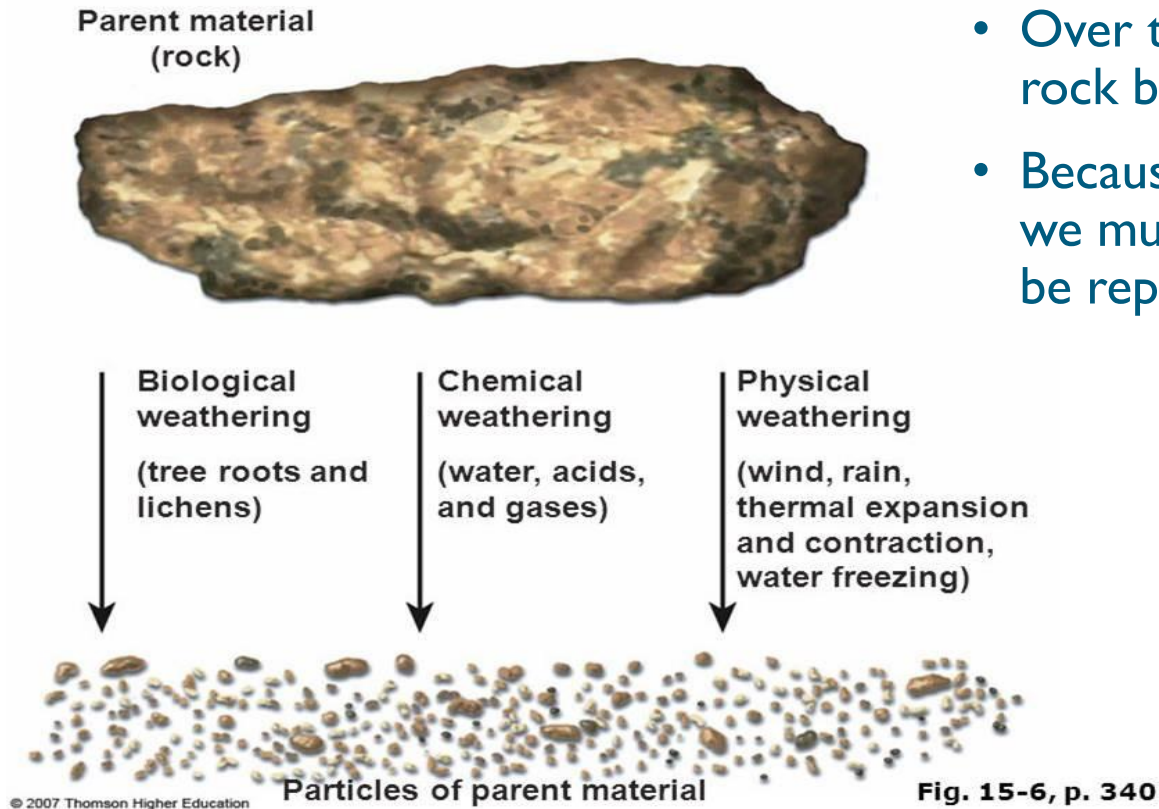
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How soil is formed?

- Rocks break into grains by weathering (wind, water)
- Over thousands of years the rock breaks down into soil
- Because soil forms so slowly, we must protect it as it cannot be replaced quickly



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Weathering can take place in many different ways



Wind



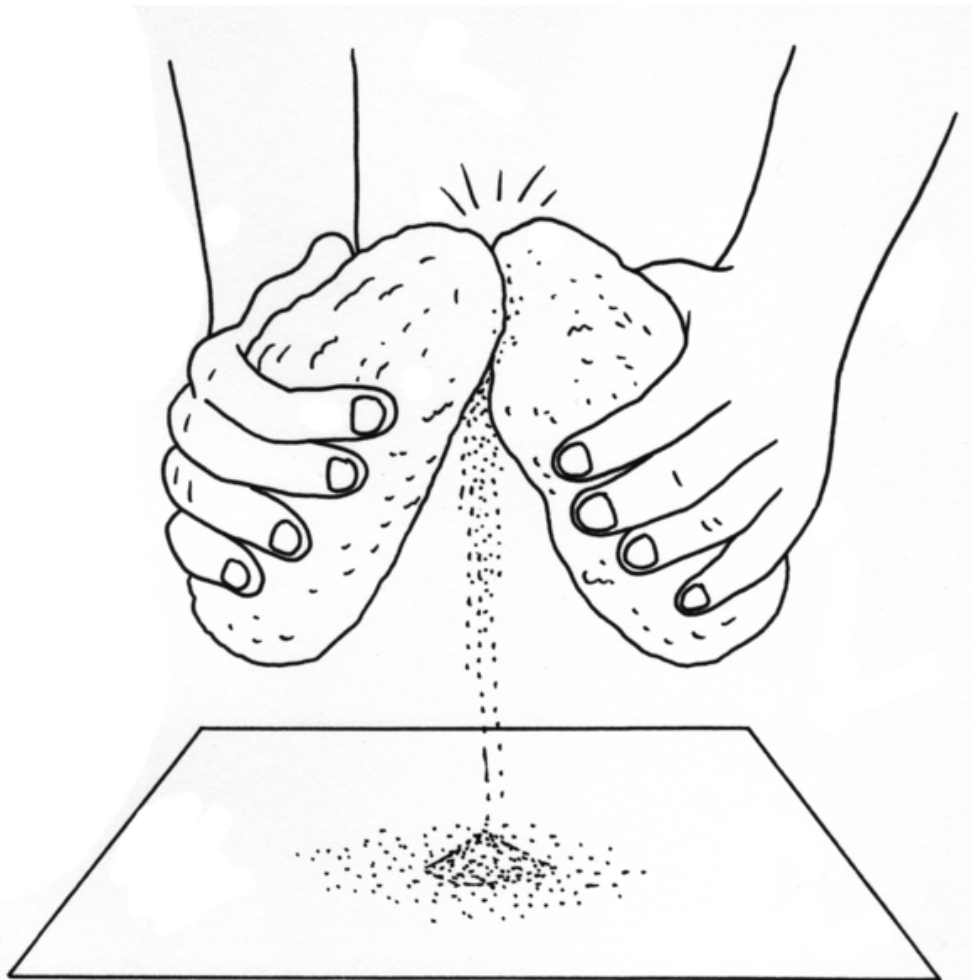
Water (sea and fresh)



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Make your own soil



- What type of soil did you make?
- Do you know why?

Word list to describe rocks and grains (*adjectives*)

English	isiXhosa	Afrikaans
gritty	hlalutye	grinterig
rough	rhabaza	grof
flaky	wecwana	vlokkerig
smooth	igudile	glad
grainy	nkozwana	korrelrig
sharp	bukhali	skerp
hard	qinile	hard
brown	mdaka	bruin
black	mnyama	swart
grey	ngwevu	grys
yellow	mthubi	geel







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5. Use the table below to help you decide what kind of particles you have.

Soil grains

Type of soil grains	How do the grains feel between your fingers?	Avakala njani amahlalutye xa uwava ngesandla?	Hoe voel die korrels aan jou vingers?
Sand			
 Coarse sand	The grains feel gritty and some are like small stones.	Amahlalutye arhabaxa amanye ngathi ngamatye amancinane.	Die korrels voel grinterig en party is soos klein klippies.
 Fine sand	The grains feel and sound gritty and the sand particles are small – like grains of sugar.	Amahlalutye arhabaxa mambi alingana neenkozwana zeswekile.	Die korrels voel en klink grinterig en die sanddeeltjies is klein – soos suikerkorrels.
Silt			
	The grains feel smooth, silky and soapy with some fine particles. They don't get sticky when wet.	Amahlalutya ampuluswa esandleni kwaye amtyibilizi. Awabi ncangathi xa exutywe namanzi.	Die korrels voel glad, syagtig en seperig, en het sommige fyn deeltjies. Dit raak nie taai wanneer dit nat is nie.
Clay			
	The grains feel sticky when wet and can be rolled into a ball. The particles are very small. When dried the grains feel like fine powder.	Amahlalutya abancangathi xa emanzi kwaye angabumbeka abeyibhola. Xa omile avakale esandleni njengomgubo.	Die korrels voel taai wanneer dit nat is en dit kan in 'n bolletjie gerol word. Die deeltjies is baie klein. Wanneer dit droog is, voel die korrels soos fyn poeier.

Questions

- Do all your rock grains look the same? Write to explain your answer.
No, all rock grains do not look the same. This is because they come from different rocks.
- How long do you think it will take you to make one cup of grains?
It will take a very, very long time.

Make your own soil activity sheet



Why we need topsoil



Soil is needed to grow food



Soil is home to many plants and animals



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LEARNER TASK

Activity: How rocks break into grains by weathering

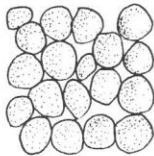
1. Draw a series of diagrams to show how a rock wears down into smaller pieces and grains over thousands of years.
2. Show how heat, cold, wind and rain can break a rock down into small pieces and grains.
3. Write a sentence below each drawing to explain what is happening. Use the word list below to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

WORD LIST

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

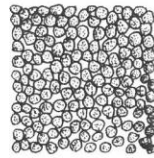
Sand

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



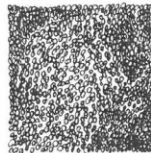
Silt

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

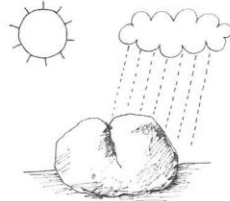


Clay

- smallest grains
- very small spaces between the grains.

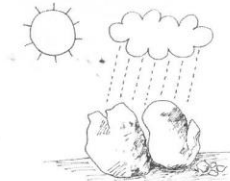


Rock today



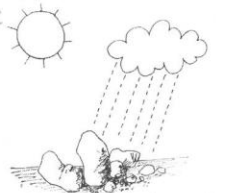
Heat, cold and rain crack the rocks.

The rock 100 years from today



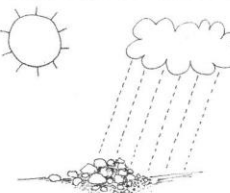
Water and wind break it down into smaller stones.

The rock 1 000 years from today



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

The rock 100 000 years from today



Eventually the rock will break down into smaller grains.

Time



Time



Time



Rocks - consolidation



Soil types



Introducing soil types – tuning in

- Soil is a mixture of different types of rock particles
- The type depends on the proportion
- We find different soils in different places –e.g. soil in Cape Town, Khayelitsha is mostly sand because it is built on a sand dune
- We get sandy, clayey and loamy soil types



Lots of hard sand grains/particles

Lots of fine clay grains/particles

Experiment: Lets find out



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What type of particles does loamy soil have?

Working in groups:

- Mix your soil with water in the jar and let it stand for the particles/grains to settle
- Draw a picture of what you have found
- Can you see different layers? Can you label these?



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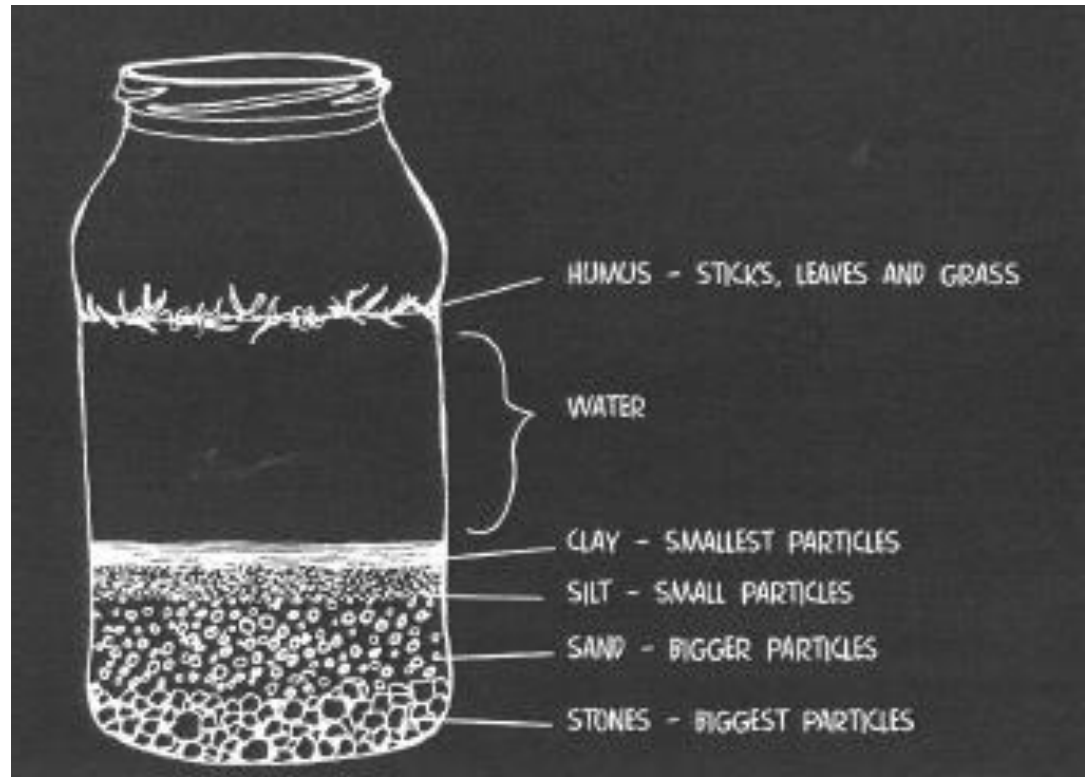
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Results

What is loamy soil?

- Loamy soil has sand, silt, clay particles and humus.
- It is the best soil for planting



Investigating how much water each type of soil holds

Sandy soil holds very little water



Loamy soil holds just enough



Clayey soil holds the most



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PRACTICAL ASSESSMENT TASK

Investigation: How much water do different types of soil hold?

TEACHER TASK

Preparation

1. Explain to learners that they are going to investigate and compare different soils to find out how much water they can hold.
2. Learners can work in groups to test the different soils. But each individual learner must complete the table, the questions and the graph.
3. Provide each group with the following apparatus:
 - spoons
 - filter paper
 - beakers or measuring cylinders
 - baby food jars or measuring jugs
 - samples of sandy soil
 - clayey soil (pure clay can be bought at craft and pottery supply shops and clayey soil can be obtained at plant nurseries)
 - loamy soil (rich garden soil or potting soil from a plant nursery are good examples of loamy soil).

Note: Soil samples can be dried and used again after this investigation.

4. Hand out the Learner Task Card 6 and assist learners to read it.
See page 59 to photocopy.



Experiment



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Checklist with criteria and possible mark allocation

Assessment to check learners' knowledge	Criteria	Possible mark allocation
<p>Can learners: Find out about soil at home or at school?</p>	<p>The learners' ideas could include finding out about:</p> <ul style="list-style-type: none"> • Colour and texture of the soil. • Analysing the soil to show its composition i.e. how much sand, clay, silt and humus in the soil. • What kind of plants and animals are found growing and living in their soil. • Etc. 	2 marks for each observation
Carry out a procedure and record findings?	<p>Learners must:</p> <ul style="list-style-type: none"> • Set up the apparatus correctly. • Make accurate measurements. • Record the measurements correctly. • Correctly calculate the volume of water held by the soil. 	6–10 marks
Draw a bar graph?	<p>Learners must:</p> <ul style="list-style-type: none"> • Plot the bars accurately. • Name and label the x-axis. • Name and label the y-axis. • Provide a suitable heading. 	8–10 marks (including a mark for neatness)
Answer the questions about their findings?	<p>Learners must show they understand that:</p> <ul style="list-style-type: none"> • Sandy soil will hold the least water. • Clayey soil will hold the most water. • Loamy soil will hold more than the sandy soil but less than the clayey soil. • Sandy soil does not hold water well because the air spaces between the particles are large and the water drains through them. <p>Give at least one reason why they think that it is good or bad for soil to drain water easily.</p>	8–10 marks including higher order questions

Adjust the marks to a mark out of 15 for recording the formal practical assessment task.



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Our topsoil is under threat

- It takes very long for soil to form
- We need to protect our topsoil as we need it for many things like growing food



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How we can protect our topsoil

- GROW, GROW, GROW - start a vegetable garden...



- GROW GREEN FINGERS - plant trees and local plants – they firmly hold on to soil



- SPEAK UP - tell everyone about the importance of soil and biodiversity



Activity: Pledge one thing you will do to conserve soil



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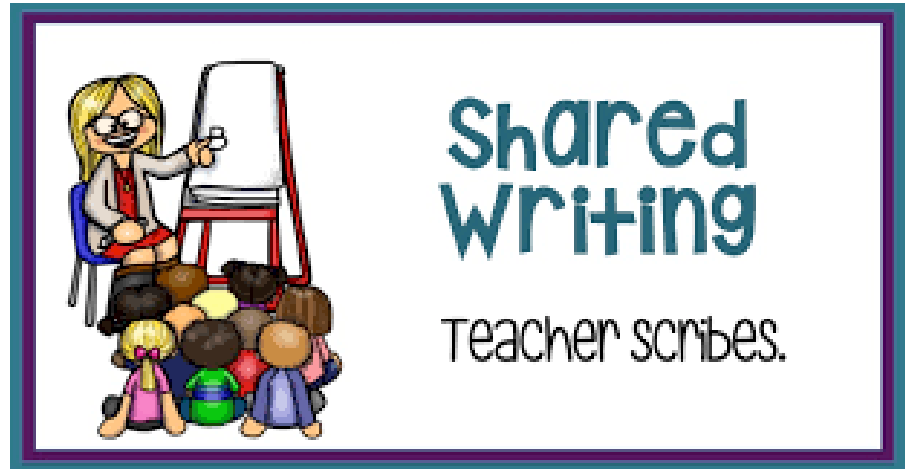
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Soil type - consolidation

Shared writing:

Let us all complete the following sentences together:

- Today I learned ...
- Soil is important because.....



Activity: Discussion on soil type programme



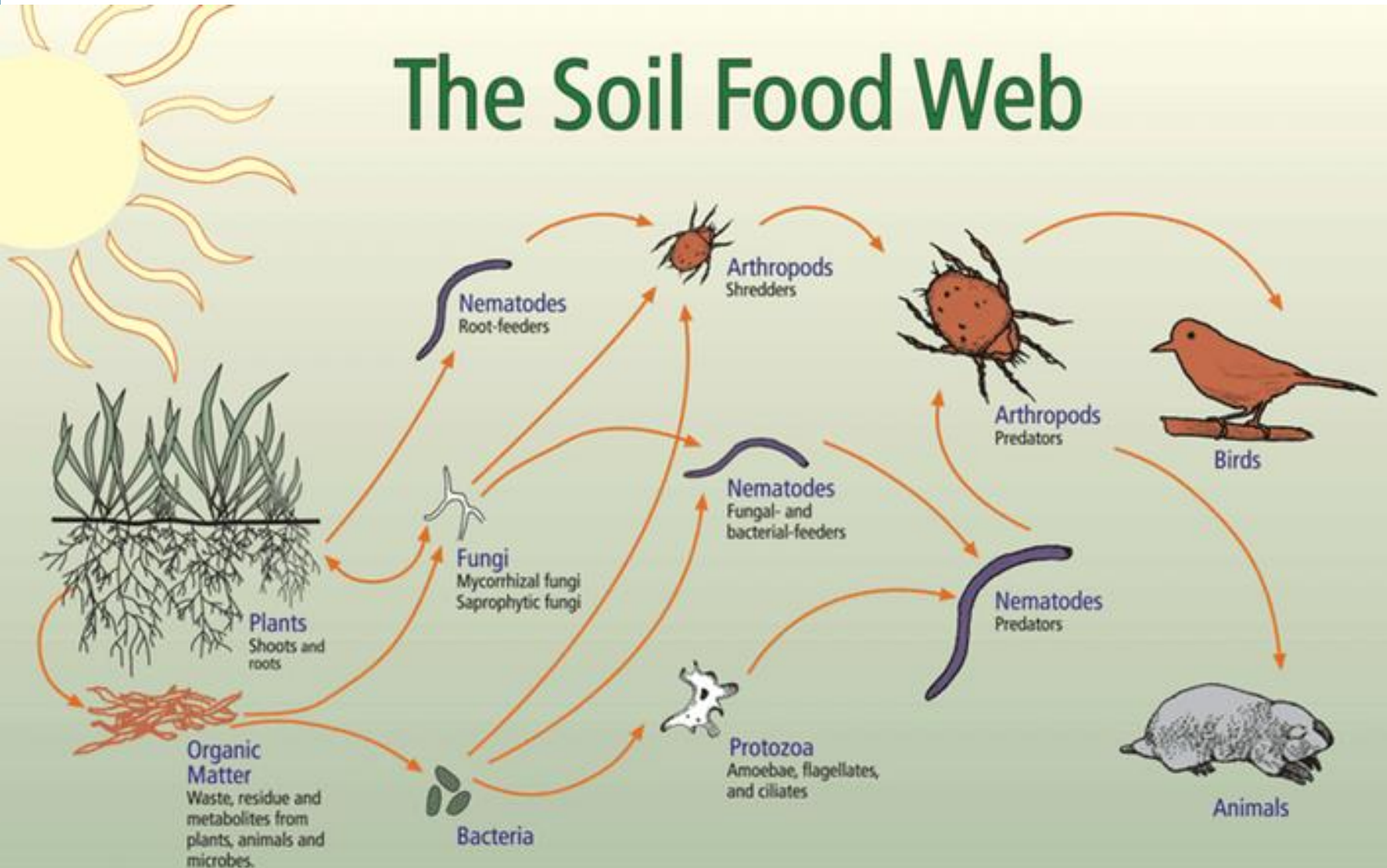
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Additional information and material

The Soil Food Web



Living soil

- Use your poster to match up the words with the pictures
- How are we as humans dependent on soil?
- What threatens our soil?



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LIVING SOIL

Common moles 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. Moles feed on plant bulbs.

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.

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.

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

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.

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.

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

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

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



Consolidation



Write down two key words that indicate something learned today



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Ask for our EE brochure

Environmental Education and Awareness at CapeNature

CAPENATURE is a public entity responsible for biodiversity and nature conservation in the Western Cape.

It offers an array of Environmental Education and General Awareness Programmes across the Western Cape which cater to the specific needs of teachers and parents. Adult programmes such as informative talks or general awareness programmes are also available on request.

All programmes are fun, interactive and aligned to the curriculum where relevant.

Only the highest standards are applied in a safe environment where learners can experience, explore and learn.

ON OFFER

- Curriculum-aligned programmes (day programmes, either on reserve or outreach)
- Holiday programmes
- General awareness programmes
- Volunteer-based programmes
- Exhibitions
- Overnight camps (can be curriculum-aligned if needed)
- Teacher Workshops

Only the highest standards

- ✓ Qualified facilitators and educators
- ✓ Safe, secure environment
- ✓ Activities, movement, problem solving

School programmes

- ✓ Literacy elements
- ✓ Curriculum alignment
- ✓ Numeracy elements
- ✓ Skills practice
- ✓ Arts and science elements (on request)
- ✓ Teachers workshops and support
- ✓ Worksheets
- ✓ Lesson plans provided

Out of school programmes

- ✓ Fun, interactive engagement
- ✓ Art and craft elements
- ✓ Learning while having fun
- ✓ Numeracy and literacy elements (children)



The outdoor classroom

Benefits of an outdoor classroom

- All programmes support and assist with classroom work
- An outdoor classroom offers an environment that enables cognitive and social development
- The teachers' progress takes place in an environment that stimulates learning

Developing social skills

- More space = less frustration and more cooperation
- Sharing an outdoor classroom environment = building better bonds with the group
- Group activities = problem solving
- Free movement = spontaneity

Cognitive development

- Using imagination = stimulating creativity
- Critical thinking = developing analytical skills
- Outdoors = excellent sensory perception



"Today's society has become so separated from nature that we actually fail to realize our basic dependence"



Environmental Education and Awareness Programmes

2019

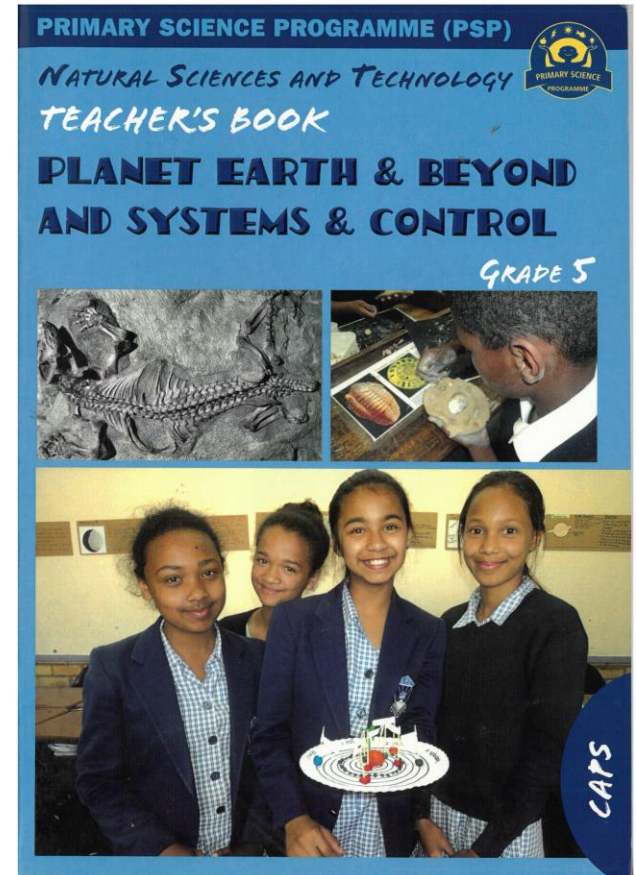
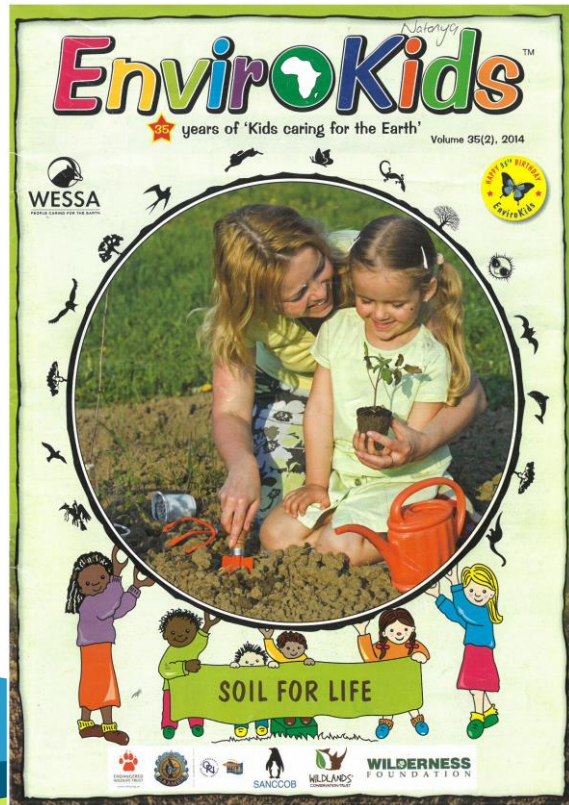


CONSERVATION FOR THE PEOPLE
WITH THE PEOPLE

Reference material:

Primary Science Programme Natural Sciences and Technology teachers book
Grade 5 Planet Earth and Beyond

Envirokids: Soil for Life Volume 35 (2), 2014



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THANK YOU.

References: WESSA and PSP
resources