

Grondkombers

Soil blanket

Isivatho soMhlaba



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A close-up photograph showing a person's hands planting a small green seedling into dark soil. The seedling has several small, round, green leaves and a reddish-brown stem. The person's hands are visible, with one hand holding the seedling and the other hand covering it with soil. The background shows more soil and some sparse grass. A black plastic container is visible in the upper right corner.

Tribute

This booklet is dedicated to the legacy of Jack Human (1950-2015) for positively changing our way of farming and our way of life in South Africa. Jack initiated, mastered and promoted the art of conservation farming with the aim of protecting our precious resource, our living soil.

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ENGLISH

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HOOFTUK 1



Ons dink grond is sommer net grond. Ons voel grond onder ons voetsole as ons kaalvoet buite op die speelgrond stap. Ons graawe met ons vingers in die sagte grond as ons vir Oupa help in sy groentetuin. Van kleins af bak ons modderkoekies met grond en water en bou paadjies tussen die vyebome waar ons met ons speelgoedtrekkers ry. Ons bou sandkastele op die strand en wriemel met ons tone in die sand. As ons partykeer te vinnig hardloop en oor ons eie voete val, lê ons kaplaks! op die grond. Ons neem grond as vanselfsprekend aan. Tog is grond net so belangrik vir lewe op aarde as wat lug en water is.

Waar kom die meeste van ons kos vandaan? Groente, vleis, roomys, vrugte...? Alles kom uit die grond uit. Grond is die basis van die meeste voedingstowwe. Plante groei in die grond. Ons eet plante (soos wortels, spinasie, appels, neute, ertjies). Diere eet plante (gras, lusern) en ons eet die diere (skaap, hoender of bees) se vleis. Ons eet kaas en drink melk en smul aan roomys – alles kos wat geproduseer word van diereprodukte – danksy die koei wat so lekker wei op die lappie lusern wat geil in die grond groei!

Kortom: Sonder grond het ons geen kos nie.





Raai wie se modderspoortjie is dié?

Lappieskometers:

Die aarde se grondkometers is eintlik verweerde rots gemeng met dooie plantmateriaal en diere-afval. Maar die lappies-grondkometers se 'lappies' bestaan nie net hieruit nie. Elke laslappie grond het 'n soompie water en bietjies lug ook tussenin. Boonop wemel die grondkometers van lewe. 'n Bietjie van hierdie lewe kan ons met die blote oog sien, soos erdwurms, insekte, molle en ander grondgoggas en gronddiertjies wat grou en grawe in die grond. Boonop sien ons hoe plantwortels soos ragfyn garedraadjes die hele grondkometers vol groei. As ons 'n lappie grond onder 'n mikroskoop bekijk, sal ons verstom wees oor wat alles daar binne-in lewe, ongesiens vir ons gewone ogies. Kilometers van swamdraadjes – fyner as die fynste spinnerakke, miljoene bakterieë en 'n menigte mikro-organismes.

Grond-laslappies:

As ons grond verder mooi bekijk, kom ons agter die grondkometers se samestelling is verskillend, afhange van die grootte van die rotsstukkies wat dit bevat. Die kleinste deeltjies is klei wat onder 'n mikroskoop lyk soos dakteeltjies. As ons water bygooi, word dit modder – die kleigrond waarin pa se bakkie vassit. Die grootste is sandkorrels. Jy kan dit tussen jou vingers laat deurglip soos kraletjies en knope of sout en suiker. Tussenin vind ons deeltjies wat slik genoem word. Leem is dié lekkerste grond en is 'n mengsel van growwe sand en kleideeltjies. As daar boonop heelwat humus (organiese materiaal) in leemgrond voorkom, is dit gewoonlik die soort grond waar plante die beste aard. Sanderige grond is meestal so poreus (gevol met klein openinkies) dat water maklik wegsyfer. Swaar kleierige grond hou weer makliker water, maar die teeltjies is so dig teenmekaar vasgedruk, dat daar nie spasie vir lug is nie. Plante se wortels het juis lug nodig. Leemgrond laat genoeg spasie vir lug en dreineer water goed sodat plante lekker kan groei.

Loer 'n bietjie op bladsy 35. Doen die grondtoetsie

Ietsie van alles:

Grond verskil van plek tot plek, afhange van die soort rots waaruit dit gevorm is, die plante wat daar groei en die klimaat. Temperatuur en humiditeit (vogtigheid) beïnvloed hoe vinnig organiese materiaal ontbind wat weer die vrugbaarheid van die grond bepaal.

Tussen die bosreuse:

As ons in die woud in die skaduwee van die bome stap, dink ons dalk die grond lyk baie vrugbaar vol welige plantegroei. Eintlik is die woudgrond nogal onvrugbaar. Die hoë reënval veroorsaak dat baie van die belangrike voedingstowwe weggespoel word. Vrugbaarheid word maar net behou danksy die hitte en humiditeit wat die plante vinnig laat groei en dus ook vinnig verrotte plantmateriaal op die woudvloer versamel.



Wat noem ons dié landbougewas?

Groei die aalwyn eerder in soet of suur grond?



Onder ons strandsambreel:

Gaan sit op jou hurke op die strand met jou tone in die seesand en bekyk die sand behoorlik. Sien jy die sandkorreltjies is verskillende kleure, groottes en vorms? Die sandkorrels is die boublokkies van die sandstrande langs die kus. Daar's dalk selfs skulpgruis tussen die sandkorrels. Boonop bly die sandkorrels nie net op een plek lê nie. Daarvoor sorg die branders wat al met die kuslyn langs breek, getye wat kom en gaan en riviere wat op strande in die see uitmond.

Soet en suur:

Die soet/suurgehalte van die grond word die pH genoem.

- Lae pH = suur.
- Hoë pH = soet (alkalies).

Op plekke waar dit baie reën, los die kalk in die grond maklik op en spoel weg, wat veroorsaak dat die grond suur raak. 'n Goeie voorbeeld hiervan is die grond in dennewoude. Asaleas, rose, heide, proteas en varings hou van suur grond. Appel- en peerbome aard ook beter in effense suurground.

Voorbeelde van plante wat goed in alkaliese of soet grond groei, is lusern, koolgewasse en droogtebestande plante. Sommige plante kan in enige van die twee grondsoorte groei. Koring en mielies hou van grond wat neutraal is – dus nie té soet of té suur nie. Voorbeelde van plante wat neutrale of effens suur grond verkies, is die meeste peulplante en populiere.

Loer op bladsy 72. Kyk na die 5 foto's. Watter plant pas nie? Weet jy hoekom dit nie pas nie?

NB voedingstowwe:

Soos vleis, brood en groente vir die mens belangrik is, is stikstof, fosfaat en potas belangrik vir plante. Dié belangrike voedingstowwe word deur die wortels in die grond geabsorbeer. Stikstof help met fotosintese. Fosfaat help met blom-, vrug- en saadvorming. Potas is belangrik vir wortelontwikkeling.

Ingewortel:

Grond hou wortels geanker sodat plante met hul 'koppe' na die son toe kan groei. Grond is die opgaarplek vir water, lug en al die belangrike voedingstowwe wat die plant deur sy wortels absorbeer om kos te maak. Grond beskerm wortels teen temperatuurskommelings. (Net onder die grondoppervlakte verander die temperatuur van dag na nag amper glad nie.) Water word deur die fyn wortelhaartjies wat naby die wortelpunte groei, geabsorbeer. Vandaar word dit vervoer na die sentrale houtagtige gedeelte van die wortel en dan na die stingel/stam en blare. Wortels hou aan met groei totdat die plant verwelk. Dikwels is 'n groter deel van die plant ondergronds as bogronds! Die wortel-netwerk van plante is verstommend. Navorsing het gewys dat 'n enkele rogplant meer as 13 miljoen wortels het met 'n gemiddelde lengte van 623 km! Sommige plantwortels groei buitengewoon diep. Die penwortel van 'n akkerboom kan tot so diep as 31m groei! Wortels kan soms lastig wees met sypaadjes wat oplig en rioolpype wat toegroei. Geelwortels, wortelagtige bolle en knolle is van die mens se belangrikste voedselbronne soos aartappels, beet, radyse, patats en uie. Knoffel – 'n bolplant wat ondergronds groei - gee geur aan baie kosdisse.



Sodra jy klaar hoofstuk 1 gelees het, dink jou eie onderskrifte vir dié foto's uit.

Het jy geweet?

- ADAMA beteken 'grond' in Hebreeus. Die naam Adam beteken dus letterlik – geskep uit die grond.
- Grond is 'n lewende hulpbron waarin byna al ons kos groei. Dit duur jare vir grond om te vorm en kan binne slegs 'n paar minute verdwyn.
- Elke jaar verloor die aarde 75 biljoen ton vrugbare grond weens erosie.
- Grond kan groot hoeveelhede koolstofdiksied in die vorm van organiese koolstof stoor en so verhinder dat dit in die atmosfeer vrygestel word.

JISLAAIK! Slegs 22 % van die aarde se grondoppervlakte kan gebruik word om 95% van ons kos te produseer. Boonop is grond 'n hulpbron wat kan opraak.

W weetpret

Woordskommels:

Skep soveel woorde as wat jy kan uit die woord: GRONDKOMBERS. Onthou elke woord moet uit ten minste 3 letters bestaan. Probeer 30 woorde uitdink. Hier is drie: DROOM, KROM, BOER.

Sjoe! As jy mooi kyk en nadink, sal jy selfs 'n woord met sewe letters uit GRONDKOMBERS se letters kan maak.



GROND-idiome

Ken jy die betekenis van dié Afrikaanse idioome (spreekwoorde) oor grond?

1. Hy voel of hy in die GROND kan wegsink.
2. Hy het skaars GROND gevat, toe begin hy werk.
3. Sy vang graag vis op droë GROND.
4. Jy het geen GROND onder jou voete nie.
5. Met sy argument staan hy op vaste GROND.
6. Hy is lankal onder die GROND.
7. Hy eet GROND.



HOOFTUK 2

Kleiner, allerkleinste, piepklein...

Hulle is kleiner as klein, selfs kleiner as die punt aan die einde van hierdie sin. Hierdie miniatuur diertjies en mini-organismes vorm netwerke van ragfyn lewende wêreldjies ondergronds. Met die blote oog sal jy hulle nie sommer kan raaksien nie. Maar onder 'n mikroskoop gaan 'n hele nuwe klein lewende goudmyn vir 'n mens oop. Selfs net 'n koppie vol grond is propvol miljoene mikro-organismes soos piepklein myte, bakterieë, swamme en nematodes.

Skurke:

Nematodes is ook bekend as aalwurms, ronde wurms en garingwurms. Nematodes is afgelei van die Griekse woord nema wat draadagtig of garingrig beteken. Dis klein organismes dunner as die dunste haartjie of spinnendraadjie. Dié nematode is 'n allerkleinste wurmpie wat 'n mens net onder 'n mikroskoop kan sien. Nematodes is dalk klein maar regte skurke. Hulle val plantwortels aan. Plantwortels wat deur aalwurms aangeval is, vorm dikkerige klonte op die wortels waar die aalwurms die vaatbundels vernietig het. As daar aalwurms in die grond is, sal jy nie aartappels daar kan plant nie, dit sal oneetbaar wees. 'n Slim plan om van aalwurms ontslae te raak, is om stink afrikaner-blommetjies op daardie lappie grond wat vol aalwurm is, aan te plant. Die stink reuk verjaag die skurke!





Foto: Martin Oeggerli

'n Grillerige grondmyt - veral as jy dit onder 'n mikroskoop bekyk - hier 556 keer vergroot. Al lyk hy na 'n grieselrige skurk is dié myt eintlik 'n held wat help om plantmateriaal op te breek.



Heide



Rakswam

Helde:

Gelukkig is die mikro-organismes ondergronds nie net skurke nie – daar's ook helde. Mycoriza is 'n positiewe swamsort, nes muf, wat op plantwortels leef. Dié held help plante om voedingstowwe te absorbeer. Die swam kry die koolhidrate uit die plantwortel en help om voedingstowwe en water uit die grond te kry. Die helde (Ericas) in die fynbos maak gebruik van verskillende soorte mycoriza-helde vir die absorpsie van voedingstowwe.

Vabond:

Nog 'n ondergrondse fungus (swam) is Phytophthora – 'n negatiewe swam wat gedy in hitte en vog en 'n vabond wat ook plantwortels aanval. Sommige plantsoorte soos proteas en avokado's is besonder sensitief vir die phytophthora-vabond

Kyk of jy 'n koningsprotea kan teken - sien bladsy 78.

Vriende:

Stikstofbindende bakterieë wat stikstof uit die grond neem en omvorm in 'n bruikbare vorm van stikstof vir plante, is 'n baie dierbare plantvriend. Die 'bak'-vriend vorm knoppies in die wortels wat stikstof uit die grond kry.

Loop soek buite in die tuin, op die speelgrond of die rugbyveld na 'n klawerplantjie of 'n ertjieplant in die groentetuin. Trek die plantjie versigtig uit en kyk noukeurig na die wortels. Jy sal hier en daar klein knoetsies aan die wortels raaksien. Hierdie knoetse word gevorm deur bakterieë op die wortels wat stikstof uit die lug omskep in 'n vorm wat in die grond gestoor word - g'n wonder mense glo 'n klawervier (klawer met vier blaartjies wat baie skaars is) bring geluk nie. Alles net 'n oulike bygeloof – maar eintlik is die klawer saam met al die ertjieplante op aarde wonderplantjies want hulle verbeter die gehalte van die grond. Boonop is die klawer ook 'n voedingsbron vir talle plaasdiere en vir die mens - danksy die klawer-heuning!



Knoop aan jou oor:

- Stouterd-aalwurms se teenwoordigheid is hoofsaaklik sigbaar deur knoetse, vratte en verwronge wortels.
- Die knoppies aan die wortels van ertjies is juis goed en word veroorsaak deur stikstofbergende bakterieë.

Swamme:

Die meeste fungi (swamme) soos byvoorbeeld paddastoele leef van die oorblyfsels van plante en diere. Die filamente (groeidrade) van die fungus 'rank' amper soos 'n spinneweb die dooie plant-en dieresterste toe en help so met die verrotting en ontbinding. Fungi is dus van onskatbare waarde om organiese materiaal te ontbind.

Rakswamme (kabouterstoeltjies) wat ons op die woudvloer tussen die welige plante op verrotte boomstompe sien groei, is belangrike grondvriende. Sodra die ou bome in die woud omval en doodgaan, help die rakswamme om al die voedingstowwe wat in die woudbome was, weer te ontsluit.





Rakswamme



Ligene (korsmosse)



Mos



Rooi fluweelmyte

Baanbrekers:

Ligene (korsmosse) is eintlik die baanbrekers van die plantwêreld. Hulle groei op kaal, ontblote rotse en help met die afbreek van klip om so grond te help skep. Korsmosse kan self sonder grond oorleef en is primitiewe plante wat sure afskei en help om die oppervlakte van rots en klip te laat verbrekkel. Waar die verweerde stukkie klip en dooie korsmosse versamel, kry mosse 'vastrapplek'. Sodra hierdie 'plat-op-die-aarde' mosplantjie ontbind, vorm dit saam met die ander oorblyfsels 'n nuwe lappie grond waar 'n plant kan begin groei.

Het jy geweet?

- Sommige voëls gebruik mosse om hul neste mee uit te voer.
- Mosse beskerm kaal, onbedekte grond teen erosie.
- Ligene word gebruik as kleursel en is die bron van litmoes, die kleursel wat gebruik word in chemiese toetse vir suurgehalte.
- Die eensellige gisswam wat die deeg, waarvan Ma brood bak, laat rys, is 'n fungus.
- Selfs die muf wat 'groeï' op ou brood is ook 'n swam (fungus).
- Rooi fluweelmyte (foto links onder) is baie groter (sowat 5mm) as die meeste ander myt-spesies. Die rooi kleur is 'n afskrikmiddel en waarsku dat hulle oneetbaar en giftig is. Hulle leef meestal ondergronds en kom net uit na goeie lentereëns om o.a. termiete en klein spinnekoppies te vreet.

JISLAAIK! 'n Kwart van die aarde se spesies (dus 25%) leef in grond.

W eetpret

Grondskommels: (soek al die grondorganismes in die volgende gekommelde woorde)

osems =

negeli =

snuufg =

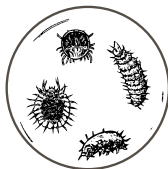
mawsme =

lwrmsava =

ekabêtrie =

zymcraio =

(Antwoorde word heel agter in die boekie gegee – maar moenie vooraf loer nie. Soek eers self die antwoorde)



WOORDBOU:

Kyk na die woordjie – **GROND** en na al vyf letters in die woord. Skryf nou ten minste vyf woorde by elke letter neer wat met grond geassosieer kan word en wat met daardie spesifieke letter begin.

G =

R =

O =

N =

D =

(Hier is 'n paar vinnige voorbeelde G=Goggas, R=Rose, O=Oppervlakte, N=Nematode, D=Droog)



HOOFTUK 3

Onder ons voete



Baie van ons dink goggas is grillerige peste. Goggas laat ons hare rys en laat ons dadelik na die insektdoder gryp. Ons trap sommer die grillerige goedjies onder ons voetsole dood. Omdat ons grondgoggas soms skaars raaksien, dink ons hulle is nie veel werd nie. Maar eintlik is grondgoggas onmisbaar op aarde. As hulle nie meer daar is nie, sal ons gou agterkom hoe ons grondkometers, plante, diere en lewe op aarde begin agteruitgaan. Dis die grondgoggas wat sorg dat plantoorblyfsels en diere-afval in kleiner deeltjies afgebreek en in die grond begrawe word. Sonder hulle sal grond net al hoe harder en meer ondeurdringbaar raak. Die miljoene tunnells wat termiete, miere en wurms grawe, sal verdwyn en sodoende sal grond nie meer deurlug word nie en water glad nie meer deursyfer nie.

Erdwurms:

Die eerste sigbare lewende wesentjies wat jy tien teen een sal opmerk, as jy met 'n tuingraaf in die grond begin dolwe, is 'n erdwurm of drie. Erdwurms is grond se Nommer 1-grouers. Erdwurms woel in die grond en is eintlik lewende ploegskare. Hierdie ploegwurms is ook ywerige grond-bouers. Wetenskaplikes het bevind dat erdwurms soveel as 18 ton onderlaaggrond elke jaar na die grondoppervlak omdolwe (Amper sewe olifante weeg soveel!) Erdwurms doen dit deur letterlik hul pad dwarsdeur die grond te vreet. In die vreetproses verteer hulle dooie blare en ander organiese materiaal en snags kom hulle na die oppervlakte en laat hopies klam, verteerde grond by hul tonnelinge. Op dié manier help hulle om suurstof en stukkies blare in die grond in te werk. Dit dra ook by tot verbeterde waterfiltrasie in die grond en skep so 'n beter leefplek vir plante.





Maak gepaste onderskrifte vir hierdie foto's. Kyk sommer ook op bladsy 49 of jy dié 6 goggas kan uitken.

Oppas!

Elke lewende wese wat in die grond leef – van die heel kleinste tot die groteres is 'n potensiële maaltyd vir iemand anders. Selfs in hul ondergrondse tunnels is hulle nie heeltemal veilig nie. Grondkewers, duisendpote en ander 'jagters' is altyd op soek na prooi.

- Oorkruipers (honderdpote) lê hul eiers in klam grond, is snags aktief en leef van prooi soos erdwurms.
- Mierleeu-larwes bou tregtervormige putvalle in sandgrond. Die mierleeu-larwe wag onder die sand aan die binnekant van die tregter vir sy prooi. Met sy groot kake gryp hy 'n mier of ander insek wat teen die putwand afgegly het, en verorber dit!
- Te veel water is ook altyd 'n gevaar vir ondergrondse wesens. Deurweeke grond bring erdwurms na die grondoppervlakte waar hulle hulpeloos lê en wag tot die watervlak daal.

Ondergrondse mini-myners:

Hoewel sommige grondgoggas die grootste deel van hul lewens ondergronds deurbring en dit hul permanente woonplek is, is daar baie wat gate in die grond net benut om eiers in te lê. Vir ander is dit net 'n tydelike wegkruipplek.

- Sandskerpioene maak hul woontunnels onder die droë sand. Die wyfie is 'n regte 'huishen' wat graag tuisbly of altyd naby haar woontunnel bly.
- Die wyfie-jagspinnkop lê haar eiers in 'n gat in die grond.
- Toktokkies lê enkele eiers (elk sowat 6mm lank) in 'n vlak holte in die grond. Die larwe wat uitbroei, leef in die grond. Toktokkies kommunikeer ook danksy die geluid wat hulle op die grond maak deur hard met hul onderlyfies teen die grond te klop en so hul maats te roep.
- Al grawende stoot die molkriek miniatuur molshopies boontoe. Molkriek-tunnels kan tot 'n meter diep wees. Die mannetjie maak 'n skril zoem-geluid wat deur die tunnel weergalm – amper soos 'n megafoon!
- Die sandwesp-wyfie maak haar nes deur 'n tunnel tot 50mm lank te grawe wat uitloop in 'n holte. Sy dra die grond tussen haar kop en voorpote terwyl sy agteruit beweeg en skop dan die grond uit die tunnel met haar agterbene. Hierna vang sy 'n snywurm wat sy al met die tunnel langs dra tot by die nesholte. Sy lê 'n enkele eier bo-op die snywurm wat sal kos voorsien aan die larwe sodra dit uitbroei. Die wespwyfie vul die tonnelingang met sand om dit goed te versteek. 'n Slim en flukse mamma!

Goed of sleg?

In die veld is sommige termiete voordelig omdat hulle plantmateriaal en dooie hout help verweer. Daar is egter ook termiete wat baie skade kan aanrig aan graanoeste, weivelde, tuine en houtgeboue.

Snywurms is die algemene naam van 'n klomp soort ruspes. Hierdie ruspes kruip bedags weg onder die grondoppervlakte en kom slegs snags uit waar hulle graag aan jong plantstingels vreet.

Die larwes van insekte soos vlieë, bly ook in tunnels onder die grond.

Die wyfie sprinkaan gebruik haar lang agterlyf om die eiertjies in 'n gaatjie in die grond, wat ongeveer 10 mm diep is, te lê. Die eiers broei onder die grond uit en die klein sprinkaantjies kruip boontoe.

Die larwes van renosterkewers is vet, wit en groot en word meestal op komposhope en hope humus aangetref. Van hierdie larwes vreet plantwortels. Die volwasse kewer vreet die stingels van jong plantjies net onder die grondoppervlakte en word daarom as 'n pes gesien – veral in landbougrond en grasperke.

Die meeste miere bou neste diep onder die grond en help so om lug in die grond deur te laat. Party mierneste kan meer as 6 meter diep wees.

Miskruiers leef van diere mis en rol dit in balletjies, wat hulle dan wegrol en onder die grond begrawe. Die mis help om die grond te bemis sodat plante beter kan groei.



Termiete

Het jy geweet?

- Erdwurms het nie pote nie, maar fyn haartjies wat hulle amper soos pootjies gebruik om hulself in die grond te anker wanneer hulle vorentoe beweeg.
- Erdwurms se koppe is spits om dit maklik tussen los grondeeltjies te kan insteek om 'n tunnel te maak.
- Daar kan meer as 'n miljoen erdwurms in net 'n halwe hektaar grond wees.
- Die werkers van sommige rysmiere sien nooit sonlig nie. Hulle spandeer hul hele lewens deur ondergrondse tunnels te grave op soek na humus en dooie hout.

JISLAAIK! Die langste erdwurm op aarde is in Suid-Afrika gevind – hy was 3,35 meter lank!



W weetpret



Sommer net somme!

Een spinnekop: Hoevel bene?

Hoeveel vlerke?

Twee spinnekoppe: Hoeveel bene?

Drie miere: Hoeveel bene?

Vier miere: Hoeveel bene?

Foto-blokkraai

Foto's van... - vul die korrekte woord in die blokkiespasie langs die gepaste foto in.



Daar is nog Weetpret op bladsy 84. Hoe gaan die miere deur die doolhof kruip?



Duinemol

HOOFSTUK 4



G

oedheid uit die grond uit

Voëls, skilpaaie, paddas, slange, renosters - 'n hele skare grond-benutters van die grootste soogdier tot die kleinste muis. Vir elkeen is grond deel van hul bestaan. Vir sommiges is dit 'n kleihuisie bo in die hoek onder die afdak, vir ander is dit 'n netwerk van tunnels ondergronds waar hulle leef en hul kleintjies grootmaak. Vir die meeste is die grondkombers 'n veilige hawe, spens, broeiplek en beskutting teen wind en weer. Ander geniet die nat grond van 'n modderbad. Selfs al besmeer die vlakvark, buffel of renoster hulle graag in 'n modderbad, is modder tog nie vuil nie. Dis eintlik gesondheid uit die grond uit!

Moddermedisyne:

Witrenosters het juis 'n swak vir modderbaddens. Maar dis nie sommer net 'n belangse bederfie nie, dis die beste doepa teen bosluise. Die parasiete word in die modder vasgevang en sodra die modder droog word en van die renoster afval, raak hy sommer ook van die nare goggas ontslae. Selfs bosvarke weet om in die modder te woel, is pret, maar ook gesond – dit beskerm hul vel teen insekbyte.

Modderhuise:

Onder die stoep-afdak is die grootstreepswael se modder-tonnelhuisie. Dit lyk nes 'n igloe en word van modderkorreltjies gebou. 'n Swaeltjie kan tot 5000 keer heen-en-weer vlieg van waar hy die modder kry tot by sy moddernes om dit klaar te bou.





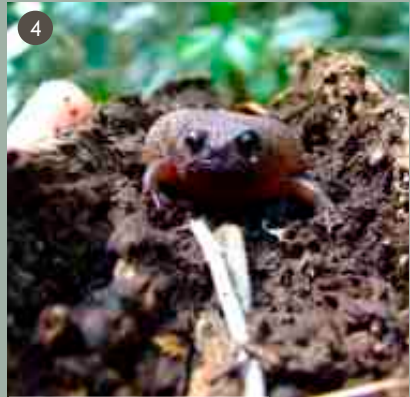
Wie woon hier?



Watter reptiel is dié?



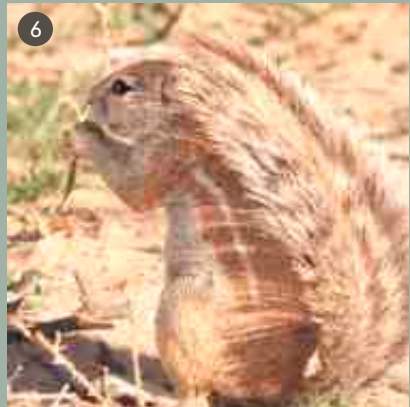
Het dié varkie 'n naam?



Wat noem ons dié padda?



Watter soort slang is dié?



Wat is my regte naam?

Ondergrondse 'huurgate':

Kopereende broei in die winter en soek 'n lekker groot gat in die grond – soos 'n ou erdvark-, spinghaas- of ystervarkgat wat as 'voorkamer' dien en lê hul 10 eiers in 'n ondergrondse kamer aan die onderpunt van die gat – soms tot 9 meter weg van die ingang.

Kleinbyvreters gebruik sommer die dak van 'n erdvarkgat vir hul tunnelwoning – amper soos 'n solderkamer!

Qu erdvarkgate word deur 'n verskeidenheid diere, soos jakkalse, ystervarke en vlakvarke gebruik vir bly-en wegkruipplekke. Vlakvarke gaan met hul stertkant eerste by hul gate in sodat hulle gereed is om met hul gevaarlike slagande aan te val as daar 'n roofdier by die gat is.

Die wyfie-likkewaan lê haar eiers sommer binne in 'n lewende termietnes. Sy graawe 'n gat in die middel van die nes en lê tot 60 eiers. Die termiete begin dadelik ywerig werk om die nes weer heel te maak en op die manier word die likkewaaneiers netjies binne-in die termietnes toegesêl. Hier ontwikkel die eiers veilig. Na die reëns broei die klein likkewaantjies uit en graawe hulself uit die reëndeurdrenkte sagte termietnes!

'Woonstel'-nesgate:

Hele kolonies van rooiborsbyvreters – soms soveel as 5000 voëltjies maak nes-tonnels in die regaf walle van rivieroewers. So 'n swetterjoel nesgate lyk amper soos digbewoonde woonstelblokke! Bontvisvangers bou ook modder-woonstelletjies naby die water.

Grouers en skroppers:

- Reënpaddas leef die grootste deel van hul lewens ondergronds. Hulle skrop agteruit in die grond in en gebruik hul agterpote om die grond weg te stoot terwyl hulle hulself stadig onder die grondoppervlakte inwurm.
- Graafneuspaddas se naam vertel sommer die hele storie! Hulle tunnel in die grond in met hul koppe eerste en maak gebruik van die harde punt van hul neuse wat nes tuingrawe werk en die grond uit die pad uit skrop.
- Erdvarke is van die belangrikste huisbouers in die natuur. Hulle is baie sterk en het kragtige voorpote met lang naels waarmee hulle baie goed kan graawe - ook om miershope om te dolwe op soek na hul gunsteling-eethappie – miere en termiete.
- Molle kom dwarsoor die wêreld voor maar word baie selde gesien. Hulle spandeer byna hul hele lewens in hul ondergrondse tunnelhuise op soek na erdwurms, grondgoggas en bolletjies om te vreet. Met hul kragtige voorpootkloue dolwe hulle die grond om. Die los grond word buitentoe uitgestoot. Dis dan wanneer ons weet daar's lewe onder die grond – kyk net al die molshope op die grasperk of sokkerveld!

Noodluike:

Veiligheid is dalk die hoofrede hoekom baie grouers hul ondergrondse huise nie net van 'n hoofingang voorsien nie; maar ook van 'n paar noodluike - sodat hulle vinnig kan ontsnap as 'n slang of jakkals by hul 'voordeur' inglip en die inwoners wil vang.

Slaaptyd:

Brulpaddas hiberneer byna heeljaar ondergronds en sal net tydens die reënseisoen uitkom, op soek na kos en om te teel. Hul tunnels is in sanderige grond en tot 1 meter diep. In baie droë omstandighede sal brulpaddas vir 'n hele paar jaar ondergronds bly.

Broeikaste:

Skilpaaie lê hul eiers in 'n gat in die grond wat die wyfie uitgrou en agterna weer opvul deur met 'n lomp maar doeltreffende stampbeweging van haar agterbene die grond mooi gelyk te maak. Sodra die ovaal eiers uitbroei, graawe die babaskilpadjies hulself uit hul 'grondbroeikaste' boontoe.

Die wyfie Kaapse kobra maak 'n holte in sagte grond tussen droë blare en lê dan 15 groot sagte eiers met leeragtige doppe. Sy hou 'n wakende ogie totdat die kleintjies uitbroei. Die klein slangetjies is dadelik selfversorgend en giftig.



Ondergrondse dorpe:

Meerkatte kan in baie droë streke oorleef. Hulle grave diep gate onder die grond, en as dit baie warm word, kruip hulle weg in hul gate, waar dit baie koeler is. Meerkatgate is soos ondergrondse 'dorpe' met 'n hele klomp kamers wat met 'n netwerk van tunnels verbind is en daar is baie uitgange wat na buite lei. Hulle gee ook glad nie om om hul woontunnels met die witkasmuiskind en waaiertert-eekhorings te deel nie.

Het jy geweet?



- Haarpootnagmuise, wat meestal in woestyngebiede bly, het baie hare op hul pote. Dit help om maklik in duinesand te beweeg en om hul pootjies teen die warm sand te beskerm.
- Erdvarke maak sommer die voordeur agter hulle toe deur hul woontunnel se gat toe te 'messel' om so al die ongewenste gaste buite te hou!
- Die Kaapse duinemol vreet nie al die plantbolletjies wat hy uitgrou nie, maar dra dit tot by sy ondergrondse 'spens' in sy tunnelwoning waar dit dikwels vergete bly en dan ontkiem en groei na die oppervlakte. In so 'n duinemol-tonnelpens is daar al tot 5000 bolletjies gevind!
- Molslange wat in sanderige grond leef, vreet graag molle. Dink net hoe wyd moet die slang se onderkaak kan ooprek om 'n mol (soms so groot soos 'n haas) te kan opvreet! Selfs 'n groterige molslang se gepunte klein koppie is skaars 3cm breed. (Die molslang versmoor darem eers sy prooi voor hy dit verorber)!



JISLAAIK! Duinemolle se skerp voortande is lekker grou-implemente en kan tot 2 ton grond per hektaar (die grootte van 'n rugbyveld) per jaar omdolwe - dis sowat vier bakkievragte vol grond!



Dink gepaste onderskrifte uit vir foto's 1-4.



Weetpret



Raai, raai riepa – wie is ek?

Ek is 'n reptiel, lê my eiers in die grond en skuil in my dop as ek bedreig voel.

Ek is 'n.....

Ek het vlerke en woon in 'n moddernessie wat lyk soos 'n igloe. Ek is 'n.....

Ek stoor tot 5000 plantbolletjies in my tonnenspens en vergeet soms waar ek dit opgegaan het. Ek is 'n.....

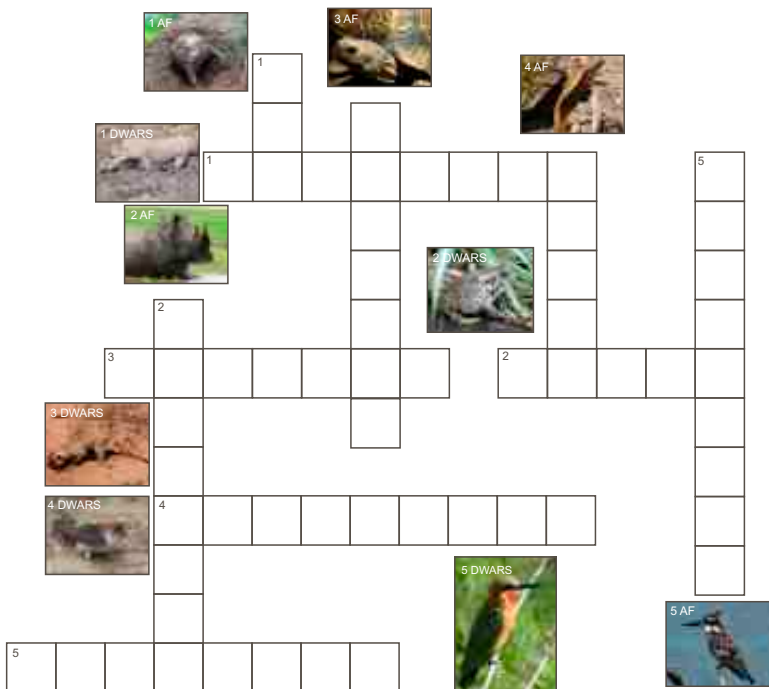
Ek vreet graag molle – al is dit nogal 'n reuse-maaltyd vir my!. Ek is 'n.....

Ek deel graag my ondergrondse woonplek met witkwasmuishonde en

waaiertert-eekhorings. Ek is 'n.....

Blok-blok jousel! (Foto-blokkiesraaisel)

Kyk mooi na die 10 foto's en vul die korrekte woorde in die regte genummerde spasies in.





HOOFSTUK 5



Ons voetspore in die grond

Maak jou voetjies nat in 'n poeletjie water. Trap nou met jou nat voete op 'n stukkie sement of plaveisel en kyk na die nat voetspoor wat jy agterlaat...Oral waar ons loop, hardloop, hurk of staan, laat ons voetspoortjies. Die nat voetspore raak sommer vinnig droog en na 'n rukkie sien ons dit glad nie meer nie. Stap ons langs die see en kyk ons terug, sien ons 'n hele ry voetspoortjies al met die skuimstreep van die strand langs. Totdat die branders hulle bietjies vir bietjies uitvee en dit spoorloos verdwyn. Net so laat die mens spore die hele aarde vol. Party word maklik uitgevee en laat die sand of lappie grond heel ongeskonde sonder spore. Maar ander mensspore maak 'n groot impak en laat 'n spoor van vernietiging agter.

Hoe lyk hierdie spore van vernietiging en wat kan ons doen?

Erosie: Sonder die grondkometers se plantegroei, word grond al hoe meer kwesbaar vir die skade wat erosie meebring. Swaar reëns kerf diep slotte en dongas in onbeskermdes grond en veral teen skuins hange. Selfs ligte reënbuie was die dun lagie grond weg. Oor maande word daardie dun grondlagie tonne waardevolle bo-grond wat ongebruik net wegspeel toe. Wind kan ook groot hoeveelhede grond wegwaai – veral in droogtetye. Swak grondbestuur, verstedeliking en klimaatsverandering maak grond meer vatbaar vir erosie. Bevolkingsgroei plaas ook meer druk op landbougrond. As die grond eers weg is, is dit vir altyd verlore.





Die botterblomme (links) en die septemberbossie (regs) is inheems. Kan jy aan nog inheemse plante dink wat in jou omgewing groei?



Skryf neer watter soort groente jy in jou groentetuin sal plant.

Maak 'n plan:

- Ons moet die bo-grond help vasanker. Die beste manier is deur plante te plant. Plant veral plante wat in ons streek goed aard – soos vetplantjies in die Karoo en Klein-Karoo-streke en fynbos in die Kaapse kus- en bergwêreld. Dis ook 'n goeie plan om inheemse plante te plant – dis plantegroei eie aan ons omgewing wat hier hoort en hou van ons klimaat.
- Natuurlik sal dit 'n uitstekende plan wees om ook ons eie groentetuin op 'n lappie grond te begin. Vars pampoene, boontjies en kropslaai uit jou eie tuintjie, sal darem heerlik proe! Boonop is dit gesond.
- Plant ook 'n boom wat koelte gee in die somer, woonplek vir voëltjies bied en die grond vashou.

Op plase waar landbougewasse (druwe, mielies, koring, lusern) verbou word, help die volgende planne teen erosie:

- Plant lanings bome of heinings aan wat dien as windskerms teen wind-erosie.
- Ploeg op die dwars kontoerlyn eerder as saam met die helling.
- Bou terrasse vir die aanplant van landbougewasse. Dit help dat die reën nie saam met die grond teen 'n skuinste wegspoel nie.

Besoedeling:

Chemiese plaagdoders kan grond op die lang duur vergiftig. Plaagdoders help om insekte wat plante vreet, te bestry, maar terselfdertyd versteur dit die balans in die natuur. Boonop maak plaagdoders al die belangrike lewende organismes dood wat in die grond woon en help met komposvorming. Groot hoeveelhede bemestingstowwe soos kunsmis, versteur die natuurlike balans van die grond.

Oplossing:

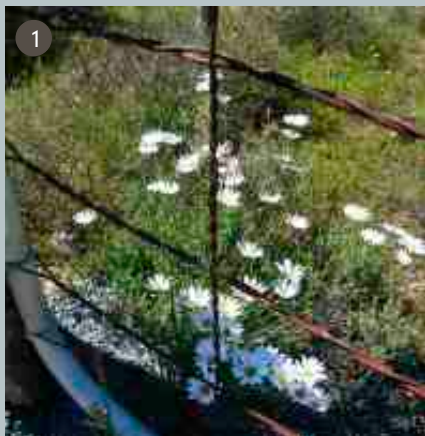
- Hoe natuurliker, hoe beter. Ons beste grond-leuse behoort te wees: Leef groen. Maak jou eie kompos – dis mensgemaakte humus en soos 'n deken, bo-op ons grondkombers.
- Huis- en tuinafval soos groente- en vrugteskille, gebruikte teesakkies, eierdoppe, grassnysels en dieremis is alles uitstekende komposmateriaal.
- Die kompos is grondbemesting in jou groentetuin of blomtuin wat by die grondkombers gevoeg word.
- Kompos word amper soos 'n verekombersie (oorgooi-kombers) bo-op ons laslappie-grondkombers.
- Kompos sit waardevolle voedingstowwe weer terug in die grond en verbeter die gehalte van die grond.
- Plante sal gesonder en beter groei en ons, die mense wat die plante (groente, vrugte, neute) eet, sal ook gesonder en 'groener' leef.
- Onthou, kompos het lug nodig. Draai die inhoud van die komposhoop in jou agtertuin dus gereeld met 'n tuinvurk om, om dit lug te gee. Selfs ou koerante is goed vir die komposhoop. Skeur die bladsye in repe en meng dit met ander 'groen' afval. Maak dit bietjie nat met 'n gieter. Die plantmateriaal in die komposhoop moet klam wees, nie sopnat nie.

Eerder as om insekdoders te gebruik, maak 'n groen plan.

- Plant 'n kruieplantjie soos basielkruid tussen rye tamaties, skorsies, pampoene en komkommers. Dit versterk hul geur en hou insekte weg.
- As jy bonekruid onder rose plant, hou dit plantluise, dopluise en muf weg.
- Roosmaryn hou wortelvlies weg en lok bye en skoenlappers na die tuin.
- Pietersielie kan naby rose en tamaties geplant word om hulle vry van insekte en siektes te hou. Boonop proe dit heerlik in slaai of ander kosdisse.
- Plant kappertjies naby brokkoli en dit sal plantluise afskrik en is ook 'n goeie grondbedekker tussen mielies, tamaties en kopkool.

Rommelstrooi:

Soliede afvalmateriaal soos skroot en plastiek, bottels en blikke besoedel die grond en ons omgewing.



Hoe gemaak? Herwin.

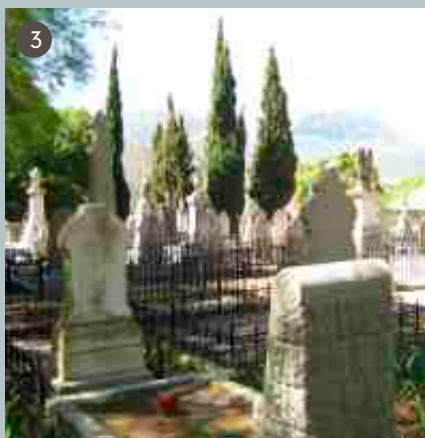
- Hou 'n spesiale drommetjie in die kombuis vir gebruikte plastiek soos joghurt- en margarienbakkies, kombuisskoonmaak-houers, roomysbakkies en melkbottels.
- Nog 'n vullisdrommetjie kan gebruik word vir leë glasbottels.
- Maak ook voorsiening vir ou kartonhouers soos die van ontbytgraankos, waspoeier, ou toiletpapier-rolletjies en ook papier soos ou tydskrifte, telefoongidse en leë lekkergoedpakkies.
- Versamel leë blikkies van blikkieskos of koeldrank in 'n herwinningshouer.

Neem dit een keer 'n week na jou plaaslike herwinningsdepot – dit word geweeg en jy kry 'n geldjie vir jou hopie herwinningsgoed. Boonop word al hierdie gebruikte huishoudelike artikels hergebruik en nie net weggegooi om ons grondkometers te ontsier nie.



Het jy geweet?

- Kompos is grond wat groei.
- Grond erodeer nou 20 keer vinniger as wat dit gevorm word.
- Polistireenbakkies neem tot 500 jaar om te verweer en word nie juis herwin nie, omdat dit baie duur is. Ondersteun dus plekke wat nie polistireen gebruik nie.
- In Junie 2015 het Pous Franciscus die volgende gesê: 'Die aarde... begin al hoe meer lyk soos 'n reuse-vullishoop.



JISLAAIK! Die gemiddelde Suid-Afrikaner dra elkeen by tot 550 kilogram rommel per jaar!

Wie woon daar?

Mense gebruik grond om huise, kerke, skole, hospitale, paaie, brûe, damme, fabriek en vele meer te bou. In ons land word inheemse wonings gebou van klei en dekgras. Potte vir huishoudelike gebruik word ook van kleigrond gemaak.

Stof tot stof:

GROND is die fondament van alles – dis ons anker, dit hou ons voete stewig op Moeder Aarde. Dis deel van die sirkel van die lewe. Dis die stof waarheen ons teruggaan as ons uiteindelik sterf.

Sodra jy hoofstuk 5 klaar gelees het, maak gepaste onderskrifte vir dié 3 foto's. Dink ook onderskrifte uit vir die foto's op bladsy 93.

Weetpret



Wat hoort op watter hopie?

Kyk mooi watter afvalprodukte kan ons herwin en wat kan deel word van die komposhoop. (as dit herwin word, skryf 'n H agterna en as dit op die komposhoop hoort, vul 'n K in.) (Hier's 'n voorbeeld: leë kartonhouers - H)

Gebruikte teesakkies -
Visblikkies -
Pampoenskille -
Bierbottels -
Plastiek koeldrankdoppies -

Ou blommervuiker -
Gebruikte toiletpapierrolletjie -
Uitgebrande vuurhoutjies -
Plastiese sakkies -
Piesangskille -

Laslappie-pret-blokraai

Lees die leidrade en vul die korrekte antwoord in die blokkies by die regte nommer in.

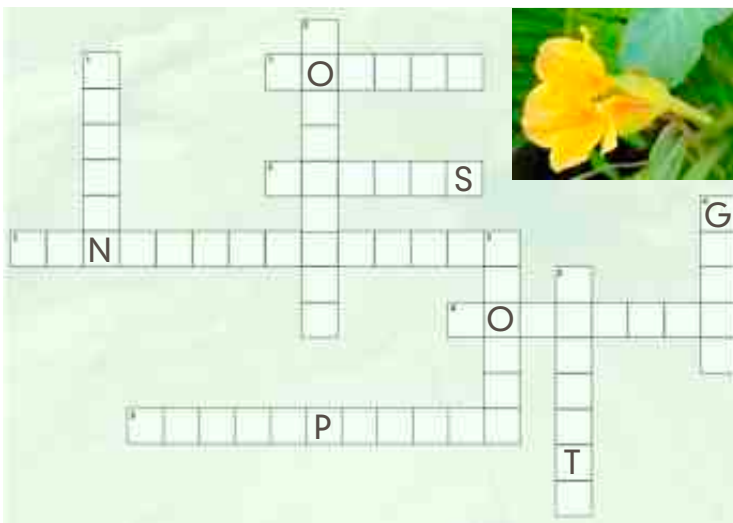
LEIDRADE:

AF:

1. Hergebruik van rommel en afvalprodukte
2. GROND is die van alles
3. Verspoeling van grond
4. Die beste GROND-leuse is: Leef.....
5. Tye van baie min reën

DWARS:

1. Mensgemaakte humus
2. Te veel plaagdoders versteur die in die natuur
3. Mielies, koring, duiwe, lusern is alles
4. Selfs ou geskeurde is goed vir die komposhoop
5. Plant eerder soos pietersielie om peste weg te hou, as om plaagdoders te gebruik.



Kyk ook op bladsy 64 of jy die regte woorde kan vind en dan blaai jy na bladsy 96 en soek saam met ons 2 maatjies al die goed wat nie in die veld hoort nie - daar is veertien versteek.



CHAPTER 1



Our blanket of soil

Do we ever really spare a thought for soil? To us, soil is merely soil and that is it. When walking barefoot outside, we feel the earth beneath our feet without being consciously aware of it. We help Grandpa in the vegetable patch, digging with our fingers in the soft soil without realising that we are delving into the very surface of earth. We grow up making mud cakes with the best ingredients: soil and water. We build dirt roads in the shade of the fig tree where we drive around with our toy tractors. We build sand castles on the beach and wriggle our toes in the sand. Sometimes we run too fast, stumble over our own feet and tumble down to earth with a thud!

Most people take soil for granted yet soil is just as necessary to sustain life on earth as air and water. Think about where most of the food that we eat comes from. Vegetables, fruit, meat, ice cream. Soil is the source of everything. Earth (soil) is the basis of the most fundamental nutrients. Plants grow in soil. We eat various types of plants (carrots, apples, nuts, peas). Beyond that animals eat plants (grass, lucerne) and we in turn end up eating the animal's meat (lamb, chicken, beef). We eat cheese, drink milk and enjoy an ice cream – all animal products – thanks to cows grazing out on a lush patch of grassland.

In a nutshell: Without soil we would go hungry.





Do you recognize this spoor?

Soil test:

- Put a bit of soil into a jar.
- Shake it well.
- Leave overnight.
- Next morning you will notice the coarse sand will be at the bottom, the clay at the top and silt and fine sand in between.



Patchwork quilt:

Earth's blanket of soil reminds one of a patchwork quilt as it consists of weathered and eroded rock fragments mixed with decaying plant and animal remains. Fringes of water cling to the countless bits of patchwork, combined with air which fills the pore spaces in between. It almost reminds of the stitching that keeps the patchwork from unravelling. Soil teems with life. Earthworms, insects, moles and other creatures burrow through soil and plant roots grow in all directions resembling threads of needlework. The vast majority of soil inhabitants live their lives unseen, unless viewed under a microscope. Miles of fungal threads, millions of bacteria, and a host of micro-organisms thrive in every acre of our life-giving soil-patchwork.

Soil-patchwork:

When we take a closer look at our soil-patchwork we notice that soils vary in texture, depending on the size of the rock fragments they contain. The smallest particles are tiny bits of clay (which resemble minute roof tiles). Once we add water to it, the clay turns into mud – the slushy soil in which vehicles often get stuck. The largest particles are sand grains of varying sizes. Like the sand on the beach. Sand can slip through your fingers like beads and buttons or sugar and salt. In between are particles classed as silt. Loam is the most fertile type of soil and is composed of clay and sand particles. Depending on the amount of humus (decayed organic material) it contains, loam is usually the most fertile type of soil. Light sandy soils are often so porous (filled with tiny openings) that they retain very little water. Heavy clayey soils can hold more water, but the particles are so tightly packed together that they leave little room for the air that the plant roots need for their survival. Loam soils have the best qualities of both: they retain water well but also leave ample pore space for air.

All kinds of everything:

Soil differs from place to place.

- The type of rock from which it was formed affects the nature of the soil.
- The plants that grow in it also leave their unique imprint.
- Climate also plays a role as well as temperature and humidity in determining how fast organic matter decomposes. This influences the fertility of soil.

Out in the wood:

Forest soil seems ever so fertile with all that growth, yet the soil is surprisingly infertile. Heavy rainfall can cause essential nutrients to wash away. Fertility is maintained thanks to the high levels of heat and humidity which promote rapid growth and, in turn, the rapid decay of plant remains, which returns nutrients to the soil.



Which type of soil do we find on the beach?



Which type of pH does this vygie prefer?



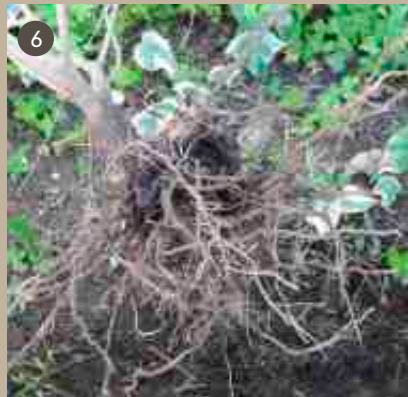
Ferns grow best in which type of soil?



Does wheat prefer growing in acidic or alkaline soil?



Do you know this tree?



Why is soil so important for roots?

Under the beach umbrella:

Go down on all fours when next you are walking along the seashore and have a closer look at the sand. It will reveal a variety of sizes, shapes and colours of sand grains which are the basic building blocks of sandy beaches. You will even notice that the sand sometimes contains pulverised seashells. Sand never stops moving as it is transported by wind and water. Rivers that feed into the sea and waves that break on the shore shift the sand from one place to another.

Acidity or alkalinity:

Also called the pH of the soil.

- A low pH = acid soil.
- A high pH - alkaline soil.

In places where it rains often, the lime in the soil dissolves easily and is washed away, which results in the soil becoming acidic. A good example of this is soil in pine plantations. Azaleas, roses, ericas, proteas and ferns prefer acidic soil. Apple and pear trees also grow well in a more acidic soil.

Examples of plants that grow well in an alkaline (sweet) soil are lucerne, cabbage and plants that are drought resistant. Some plants grow well in either type of soil. Wheat and maize grow best in a neutral soil, which is neither too acidic nor too alkaline. Examples of plants that prefer a more neutral to slightly acidic soil are most legumes and poplars.

NB nutrients:

Meat, bread and vegetables are important for humans. In the same way the three main nutrients – nitrogen, phosphorus and potassium – are important for plants. These important nutrients are absorbed via the roots of the plant. Nitrogen aids the plant with photosynthesis, whilst phosphorus is important for the production of flowers, seeds and fruit. Potassium nourishes roots to develop well.

Stay rooted:

Soil supplies the firm anchorage that plants need for support as they grow towards the sun. Roots act as reservoirs for the water and other essential nutrients that plants use, along with the air, to manufacture food. Soil also protects the roots from rapid changes in temperature. Just below the surface the temperature barely changes from day to night.

Water is absorbed by roots through the fine hairs that grow near the root tips. It is then passed into the central, woody part of the root, which carries it to the stem and leaves. Often the larger part of a plant's mass is found below ground! Roots keep growing until the plant dies. The sheer volume of roots is amazing. Research found a single rye plant to have more than 13 million roots with a combined length of 623 km! The roots of some plants reach astoundingly deep. The taproot of an oak may extend as far as 31 metres! Roots can be troublesome at times, buckling sidewalks or invading drainpipes. However their usefulness outweighs this since root-like organs



Look at these camel thorn pods. What is an important nutrient in soil that helps with seed production?

such as tubers and bulbs are among humankind's chief sources of food. Carrots, radishes, potatoes, sweet potatoes and onions are mainstays of the human diet. Even garlic – also a bulb – adds flavour to a menu.

Did you know?

- ADAMA means soil in Hebrew. The name Adam therefore literally means 'made out of earth'.
- Soil is a living resource in which nearly all our food grows. Soil takes years to form, yet it can vanish within minutes.
- Each year 75 billion tons of fertile soil is lost to erosion.
- Soil can trap huge quantities of carbon dioxide in the form of organic carbon and prevent it from escaping into the atmosphere.

WOW! Just 22% of the earth's surface can be used to produce 95% of our food. What is more - soil is not an unlimited natural resource.

Turn to page 69. Can you identify the plants in the numbered pictures 1-5?
On page 72 see whether you can identify the various plants and figure out which plant does not fit. Can you explain why?



Fun to know!

Word jumbles:

Make as many words as you can, using only the letters in the word: NOURISHMENT.

Each word must consist of at least three letters. Try to make at least thirty words! Here are three examples: use, men, run. If you look carefully you may even make a word with seven letters from the letters used in NOURISHMENT.

What on EARTH!

Do you know the meaning of these English proverbs and expressions?

- 1.To come back to EARTH.
- 2.What on EARTH!
- 3.To feel as if the EARTH could swallow one.
- 4.To have no EARTHLY chance.
- 5.To fall on fertile SOIL.
- 6.On foreign SOIL.
- 7.One's native SOIL.



CHAPTER 2

Small, smaller, minute...

They are smaller than small, even smaller than the full stop at the end of this sentence. These miniature creatures and mini-organisms form a cobwebby network of living little worlds underground. One cannot see them with the naked eye, yet under a microscope a whole new mini-world comes to life. Even just a single cupful of soil can contain millions of micro-organisms, minute spider-like mites, tiny bacteria, fungi and nematodes.

Crooks:

Nematodes are also known as roundworms or eelworms. The word nematode is derived from the Greek word nema which means threadlike. These organisms are thinner than the thinnest spider thread. It is a minute worm that is visible only under a microscope. But do not be fooled by their size because these worms are real crooks which attack plant roots. Thick lumps form on the roots where the roundworms have damaged them. Once roundworms have taken over a patch of soil, one cannot plant potatoes there since they would be inedible. A clever way to get rid of roundworms is to plant smelly African marigolds on the roundworm-infested patch of soil. The smell will get rid of the crooks!





After you have read this chapter, make suitable captions for these 2 pictures.

Heroes:

Fortunately not all the underground micro-organisms are crooks – there are also heroes. Mycorrhiza is a good type of fungus, similar to mildew, that lives on plant roots. This hero helps plants to absorb nutrients. The fungus takes the carbohydrates from the plant root and assists in the absorption of nutrients and water from the soil. The ericas in the fynbos make use of a variety of Mycorrhiza-heroes to help with the absorption of nutrients.

Rascal:

Another underground fungus is Phytophthora – a 'baddie' fungus which thrives on heat and moisture and a rascal that also attacks plant roots. Plants like proteas and avocados are especially vulnerable to this rascal.

Pals:

Nitrogen-fixing bacteria take nitrogen from the soil and convert it into a user friendly form of nitrogen for plants and are therefore true plant pals. These 'bac'-pals form nodules on the roots which help to absorb nitrogen from the surrounding soil.

Run off into the garden and search for a pea plant in the veggie patch. Or look for a clover plant out on the soccer or rugby field. Now carefully pull the plant from the soil and have a close look at its roots. You will notice little nodules (lumps) on the roots which are formed by bacteria that convert nitrogen from the air into a form stored in the soil. Small wonder people believe a four-leaf clover (which is relatively rare) brings good fortune. Pure superstition, of course. Yet the clover, along with its related legume plants like lucerne, peas, ground nuts and soybeans, are all actually plants of good fortune since they improve the quality of the soil. Clover also serves as excellent pasture crops for farm animals. And, as a fringe benefit, the clover yields a delicious honey.



NOTE: Do not get mixed up!

- In soil where the villainous eelworms are present the roots will be knotty, wart-like and contorted.
- The small knots seen on the roots of peas are the good guys and caused by nitrogen-fixing bacteria.

Fungi:

Most fungi (e.g. mushrooms) live off the remains of plants and animals. The filaments (slender growing threads) of the fungus shoot tendrils similar to a cobweb all over and through the remains of plants and animals and in so doing aid in the decaying process. Fungi are therefore invaluable for their role in the decomposing of organic material.

Goblin chairs:

Bracket fungi (goblin chairs) are found in the lush forest vegetation growing on decaying tree trunks. These fungi are important soil friends and play a vital role as decomposers in the forest, releasing the nutrients trapped in tall trees after they have fallen and died.



Go back to page 11, look at the grizzly grizzmo. Translate the Afrikaans description into English. Turn to page 75. Identify the orange flower (bottom right) and explain how it is helpful in soil.



Mosses



Lichens

Pioneers:

Lichens are in a sense the pioneers of the plant world. On barren rocky outcrops, the first and sometimes only plants to take hold are tenacious, crusty patches of lichens which are able to live without soil. These strange and primitive plants produce acids that help disintegrate the surface of the rock. The weathered rock fragments and the dead remains of lichens then form a foothold for mosses which play an important role in forming soil where other plants can take root. Once these low-growing mosses decay they also turn into components of soil.

Did you know?

- Some birds use mosses to line their nests.
- Mosses protect bare soil from erosion.
- Lichens are used as dyes and are also the source of litmus, the dye used in chemical tests for acidity.
- The single-celled yeasts that cause dough to rise are fungi.
- Even the fuzzy mould that sometimes forms on stale bread is a fungus.
- Red velvet mites (see picture at the bottom of p42) live in the soil and remain underground for most of the year, only emerging during spring rains. They are large compared with their miniature fellow mite species and aid the ecosystem by feeding on smaller invasive insects, preventing them from destroying vegetation.

WOW! A quarter of the world's species (25%) live in soil.

According to microbiologists in just a ¼ teaspoon of fertile soil you could find 50 nematodes and up to 25 million bacteria.

Fun to know!

Juggle the letters:

(search for all the soil organisms in the following juggled words)

semssso =

sniechl =

snuufg =

mwouorsrdn =

ecabatir =

mzrhcaeyroi =

eesmota dn =



(Answers are given in small print right at the end, in the back of this booklet – but don't peak. See whether you can work out the answers yourself).

O, my word!

Look at the word – **SOIL** - and the four letters in this word. Now write down, next to each letter, at least five words that you can associate with soil and which start with that specific letter.

S=

O=

I=

L=

(a quick example: S=sand, O=oxygen, I=irreplaceable, L =loam)



CHAPTER 3

Life underfoot



Creepy crawlies are everywhere. Some make our skin crawl; others make the hair on the back of our neck stand on end. These underfoot bugs often make us run for the pesticide. Or we crush them beneath our feet, not giving them a second thought. Most are so small that we hardly notice them, let alone consider their significance. Yet these insects, bugs and 'goggas' living all over our blanket of soil are indispensable. Without them we will soon notice how the soil, plants, animals and eventually life on earth start to deteriorate. These creepy crawlies help break down and bury dead plant litter and animal remains. Without them soil would become hard and compacted. As a result there will not be any underground tunnels dug by termites, ants or worms and air and water will be unable to pass through.

Earthworms:

When you start digging with your spade in the garden the very first little creature you are bound to come upon, should be an earthworm. Earthworms are the Number One digging agents of soil! Earthworms are living ploughs. Not only are they expert diggers but also important soil-builders. It has been calculated that on an acre of good soil, earthworms can bring as much as 18 tons (the weight of roughly seven elephants) of subsoil to the surface each year! They do this by literally eating their way through the earth, digesting its content of dead leaves and other organic material, and eliminating the rest on the surface as soiled nutrient-rich castings. In so doing the earth worms improve the quality of soil by allowing air to come in and water to trickle through.





Can you identify all these creatures?
Turn to page 17 and identify these creepies in English. And do you know their Afrikaans names?

Watch out!

From the smallest to the largest, every creature living in the soil can be a meal for someone else. Even in their burrows they are not entirely safe. Ground beetles, centipedes and other hunters are always on the prowl for smaller prey.

- Earwigs (centipedes) lay their eggs in moist soil, are active during the night and prey on earthworms.
- The larvae of ant lions build funnel traps in sandy soil and wait under the sand at the bottom of the funnel for their prey (be it an ant or another insect) to tumble into the trap. The hapless victim is then grabbed by the ant lion's fierce pinchers and devoured.
- Too much water is a constant hazard for underground animals. Saturated soil, for example, brings earthworms to the surface where they wait helplessly for the water to recede.

Underground 'mini miners':

Some beetles, bugs and other soil critters spend the majority of their mini lives underground; others only make use of tunnels or burrows to lay their eggs in or as a hideout.

- Sand-dwelling scorpions make their living quarters in burrows in dry sandy areas. The female is a home lover – she stays in or near her burrow.
- The female Sun spider lays her eggs in an underground burrow.
- Toktokkies lay single eggs (each about 6mm long) in a shallow hollow in the ground. The larvae that hatch live in the soil. The toktokkie communicates by knocking loudly on the ground by raising its abdomen and then tap-tapping on the surface of the ground to call its mate.
- As it burrows, the mole cricket kicks up little mounds of earth like small molehills. The burrows can be as much as a metre deep. The chirruping, shrill buzzing sound which the male emits echoes through its burrow – just like a mini megaphone!
- The female sand wasp makes her nest by digging a 50mm long tunnel leading to an underground hole. She carries the soil backwards between her head and forelegs, then kicks it out of the tunnel with her hind legs. A cutworm is dragged back to the burrow and placed in the hole. A single egg is laid on top of the cutworm, which will provide a meal for the larva when it hatches. Finally the wasp fills the entrance tunnel with sand to disguise it. A clever and diligent wasp-mom!

Good or bad?

In the veld, some termites help break down vegetation and dead wood. Other species, however, can do a great deal of harm to pastures, crops and gardens and also wooden buildings.

“Cutworm” is a general name given to several different kinds of caterpillars, all of which have similar habits. During the day the cutworm hides under the surface of the soil and only comes out at night to feed on the stems of young plants.

The larvae of insects like flies also live in tunnels underground.

The female grasshopper uses her long abdomen to make a hole of about 10mm deep in the earth where she lays the eggs which hatch underground. Once hatched, the young grasshoppers claw their way to the surface.

The larvae of the rhinoceros beetle are white and very large and are usually found in manure heaps or piles of humus. Some of these larvae feed on plant roots, while the adult beetles nip through the stems of young plant shoots just below ground-level. For this reason they are considered pests on cultivated land and lawns.

Most ants build their nests deep underground and help ventilating the soil. Some ant nests can be more than 6 metres beneath the surface.



Ants devouring a termite.

There is an ant labyrinth on page 84. Do you know the way out?



CHAPTER 4

B

reaking ground



Birds, tortoises, toads, snakes, rhinoceros and a whole host of other creatures – from the tiniest mouse to the biggest mammal – all depend on soil. For some it is a little clay hut in the corner under the eaves; for others it is an underground network of tunnels where they live and raise their young. For most this blanket of soil is a safe haven, pantry, breeding ground and shelter to hide from wind and weather. Others enjoy the wet soil of a mud bath.

Magic mud:

The white rhinoceros loves mud baths. The mud traps ticks, and when this dries and falls off, the nasty parasites are shed too! Buffaloes also love cooling down in a muddy pool on a warm summer afternoon. Even the bush pig knows instinctively that wallowing in mud is fun and healthy because the mud cools and protects its skin from insect bites.

Mud homes:

The Greater Striped Swallow builds its nest in the corner of the verandah. It looks like an upside down igloo and is built of mud pellets. A swallow mud home takes up to 5000 or more building flights to complete and can last for many years if not damaged.





Make apt captions for these pictures.
Identify the little bird on the previous page (p54).

Holes for hire:

Shelducks breed in winter and look for a large used burrow, such as that of an aardvark (ant bear), porcupine or springhare. This hole leads to a big room at the end of the burrow – sometimes up to 9 metres from the entrance – where the female shelduck lays 10 eggs.

Little bee-eaters are quite upstairs, often making their nest in the roof of an aardvark burrow in their very own little loft!

Used aardvark burrows are 'hired' by quite a number of animals like the black-backed jackal and warhogs which use them as homes or places to hide in.

The female monitor lizard lays her eggs inside a living termite nest. She digs a hole in the centre of the nest and lays up to 60 eggs. The termites immediately set to work repairing the nest and so seal the leguaan eggs inside the nest. Here the eggs develop in safety. After rains the eggs hatch and the young dig themselves out of the rain-softened termite nest!

Flat dwellers:

Carmine bee eaters use sandbanks to dig nesting tunnels. When up to 5000 of these birds make their nesting tunnels in river banks, it looks like densely populated flats! Most kingfishers also build mud flatlets close to water.

Burrowers and scrapers:

- Rain frogs spend most of their time underground. They burrow backwards using their hind limbs to shift the soil and in so doing, slowly disappear beneath the surface.
- Shovel-nosed frogs – the name says it all! They tunnel head-first, using the hardened tip of their snouts like shovels.
- Aardvarks are extremely strong and have stout forelimbs and sharp claws with which they can burrow a shelter in minutes. With their claws they can also easily burrow into an ant hill to find their favourite food - ants and termites.
- Moles are found all over the world but are seldom seen, for they spend most of their lives underground. As they tunnel in search of earthworms, insects, grubs and bulbs to eat, they almost 'swim' through the soil by pushing the dirt aside with their powerfully clawed paddle-like front feet. The loose soil is thrown up in mounds. When you see the mole hills on the lawn you know there is life underground.

Escape hatches:

Many burrowers make lots of underground entrances and exits so that they can escape easily from snakes and jackals.

Bedtime:

Bullfrogs hibernate underground for much of the year and only come out to feed and breed when the rain starts. The burrows are about one metre deep in sandy soils. If it is very dry, they may even stay underground for several years.

Incubators:

Tortoises lay their eggs in a hollow in the ground which the female digs and fills afterwards in a clumsy, yet effective way. She does so by stamping with her hind legs, flattening the soil all around to conceal the 'incubator'. Once these oval shaped eggs hatch, the baby tortoises dig themselves to the surface.

The female Cape Cobra makes a hollow in soft soil amongst dry leaves and then lays 15 big soft eggs with leathery shells. She stays near the nest and keeps a watchful eye until her young are hatched. Once hatched the baby snakes are immediately able to care for themselves and are already venomous.

Have a look at page 25 and identify all the animals in these pictures. On page 90 you can connect the dots and find the hidden animal.



Underground villages:

Meerkats are able to survive in very arid areas. They burrow deep tunnels underground and once it gets very warm, they scuttle away to the cool safety of their burrows. These underground 'villages' which they excavate consist of various 'rooms' linked with a network of tunnels and many exits. Meerkats will often share their burrows with yellow mongooses and ground squirrels.

Did you know?

- The Hairy-footed gerbil lives mostly in desert areas and has very hairy padded feet – hence the name. This helps it to move easily in dune sand and also protects its paws against the heat of the sand.
- Aardvarks sometimes 'shut the door' behind them by plugging up their tunnels – perhaps to keep out unwanted 'guests'.
- Mole rats do not eat all the bulbs they find, but store many in dead ends (up to 5000 bulbs!) If the food stores are neglected, the bulbs sprout and grow to the surface.
- Mole snakes burrow in sandy soil searching for moles to eat. Can you imagine how wide it can open its mouth to swallow its prey often as big as a rabbit! Even a large mole snake has a relatively small pointed head, about 3cm across. (The mole snake first suffocates its prey before eating it.)

WOW! Mole rats have sharp incisors which are ideal digging tools helping them turn up to 2 tons (2000 kg) of soil per hectare per year. That equates to about four 'bakkie' loads of soil in an area roughly the size of a rugby field.



Can you identify these 3 little fellows (at the top) who do not mind sharing their underground burrows?

Fun to know!



Guess who?

I reverse into my burrow when I am threatened.

I am a

I live in underground 'villages'.

I am a

I tunnel head-first using the hardened tip of my snout as a shovel.

I am a

I share my underground burrow with meerkats and yellow mongooses.

I am a

I lay my eggs in a living termite nest.

I am a

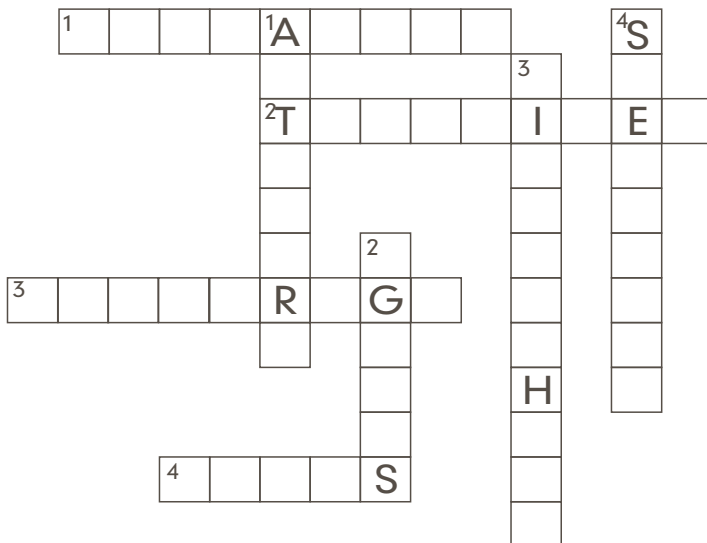
Clues to amuse:

ACROSS:

- 1) love cooling down in mud pools.
- 2) flattens the soil around the nest to conceal it.
- 3) hibernate underground for much of the year.
- 4) are shed along with the mud.

DOWN:

- 1) can easily burrow into an ant hill.
- 2) The swallow nests look like mud
- 3) all live in mud 'flats' in riverbanks.
- 4) make their nest in a used underground burrow.





CHAPTER 5

The human footprint

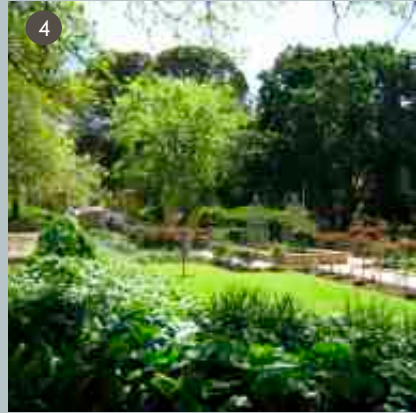


Wet your feet in a puddle of water. Now step onto a piece of cement or paving and look at the wet footprint that you have left behind... Everywhere we walk, run, squat or stand, we leave footprints. The wet footprints dry quickly and after a while we hardly see them anymore. When we walk along the seashore and we look back we notice a row of footprints all along the beach, until the waves start erasing them bit by bit. We leave a trace of footprints all across the earth. Some are easily erased and leave the sand or patch of soil intact. But other human footprints make a big impact and do a lot of damage.

What do these footprints of destruction look like and what can we do?

Erosion: If you take away the plants the soil can erode easily. Heavy rains carve deep gullies in unprotected slopes and valuable top soil is washed away. Winds too can carry away huge quantities of soil, particularly in times of drought. Poor land management, urbanisation and climate change all contribute to make soil more prone to erosion. Population growth increases pressure on farmlands. Once gone, the soil is lost forever.





Look at these colourful pictures and make suitable captions after having read this chapter. Then turn to page 31 and think of suitable captions for each one of these pictures. Also try to do the Afrikaans crossword on page 32.

Make a plan:

- We must help anchor the soil. The best way is to plant plants. Furthermore, a clever idea would be to plant indigenous plants – for example succulents in the Karoo and Klein-Karoo and fynbos in the Cape-coastal and mountainous regions. Indigenous plants are plants that are natural to our environment and climate.
- It would also be an excellent plan to start you own vegetable garden – even if it is just a small patch in your back yard. Fresh pumpkin, beans and lettuce from your very own garden to be served for lunch would be tasty, wouldn't it? Besides, veggies grown naturally in your own garden are healthy too.
- Plant a tree to provide shade in summer and a nesting place for birds. At the same time it anchors our soil blanket.

Other measures on farmland that can help guard against soil erosion:

- Growing so-called 'cover crops' of fast growing plants such as clover will bind the soil on idle land.
- Ploughing horizontally along the contour lines of slopes rather than up and down slopes, helps to slow down the runoff of rain.
- Terracing also helps prevent the topsoil from being eroded.
- Soil cover is the best protection of top soil because it feeds insects.

Pollution:

Chemical pesticides can poison soil in the long run. Although pesticides may help get rid of unwanted insects, the natural balance is disturbed in the process. Pesticides also kill many of the important organisms that live in soil and help create compost. Large quantities of fertilisers also disturb the natural balance in soil.

Make a plan: The natural way is the best way. The best soil motto should be: Live green. Make your own compost – real man-made humus (decaying vegetable and animal matter).

- House and garden waste like peels from vegetables and fruit, used tea bags, egg shells, grass cuttings and well-rotted farmyard manure are good to use for compost.
- The compost fertilises the soil in the vegetable garden or flowerbeds.
- Compost almost becomes the second 'fleece blanket' on top of our quilted soil patchwork.
- Compost helps recycle valuable nutrients and improves the quality of the soil.
- The plants in compost rich soil will be more nutritious and healthier. People who eat these plants (veggies, fruit and nuts) will live healthier and 'greener' lives.
- More or less anything that you find crawling or flying around a compost heap is beneficial. They are part of nature's machinery for disposing of dead organic material.
- Keep in mind: Compost needs air. Lift the compost heap occasionally with a garden fork to air it. Plant material should be moist, not soggy. Even old newspapers are good for the compost heap. Tear the pages into strips, mix with hedge clippings and other green waste, in equal volumes. Dampen the mixture with a watering can and add it to the heap.

Rather than using insecticides, think green.

- Plant basil amongst the rows of tomatoes, gems, pumpkin and cucumber. It not only brings out the natural flavour of the vegetables, but also keeps away insects.
- If you grow winter savoury under the roses, aphids and mildew will be kept at bay.
- Rosemary attracts bees and butterflies to your garden.
- Parsley can be planted close to roses and tomatoes, keeping them free from insects and pests. Parsley also adds flavour to many a recipe.
- Grow nasturtiums close to broccoli and it will frighten off aphids. It also serves as excellent groundcover amongst maize, tomato and cabbage plants.

Littering:

Solid waste like scrap metal, plastics, glass and tin pollute our soil and environment.



1

What to do? Recycle!

- Keep a special bin in the kitchen for all used plastics like yoghurt cups, margarine tubs, ice cream buckets and milk cartons.
- Another bin should be marked for all empty glass containers, bottles and jars.
- Also make space for old and used paper products, for example used cartons of washing powder and cereals, empty sweet packets – even empty toilet rolls.
- Another container can be marked for used tins such as canned food tins, cool drink tins and the like.

Take all your recycled material once a week to your local recycle depot. It will then be weighed and you could even get a bit of money for your recycled items. All of these used domestic products are now being re-used and not just simply thrown away harming our soil.



2

Did you know?

- Compost is growing soil.
- Soil is now eroding up to 20 times faster than it is being developed.
- Polystyrene, a type of foamy plastic, takes up to 500 years to disintegrate and is not really recycled because it is too costly. So rather support industries that do not use polystyrene.
- In June 2015 Pope Francis said the following: "The earth... is beginning to look more like an immense pile of filth."

WOW! The average South African produces 550 kg of waste per year.

People are living here:

We utilise soil to build houses, churches, schools, hospitals, roads, bridges, dams, factories and so much more. In our country indigenous dwellings are built of clay and thatch. Pots for household use are also made of clay.

Dust to dust:

Soil is the foundation of everything. It is our anchor and keeps our feet firmly on Mother Earth. It is from dust that we are formed and to dust that we shall return when we die.

As Mufasa put it so eloquently to Simba in Disney's The Lion King: "Everything you see exists together in a delicate balance... from the crawling ant, to the leaping antelope... When we die, our bodies become the grass and the antelope eat the grass. And so, we are all connected in the great Circle of Life."



3

Make captions for these pictures. Turn to page 96 and search for all the items which do not belong in the forest. See whether you can find 14.

Fun to know!



Hide and seek.

Hidden in these blocks of letters are four words (phrases) that refer to things which are harmful to our soil blanket and four words that refer to helpful things. Search for them in these blocks and colour in the correct word blocks in your favourite colour.

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



ISAHLUKO 1

ISivatho soMhlaba



Ingaba sikhe siwuthabathele ingqalelo eyiyo umhlaba kusini? Umhlaba kuthi ngumhlaba kuphela ayikh' enye into. Ukuba sihamba phaya phandle singanxibanga nto ezinyaweni, siya kuwuba umhlaba phantsi kweenyawo zethu nakuba siye singananzi nto iyenye ngawo. Sikhe simncedise nomtatomkhulu xa elima kwesaa sitya sakhe semifuno. Sisebenzisa iminwe yethu ukumba umhlaba othambileyo singaqaphelanga ukuba sigrumba umphezulu womhlaba. Sakhula sisenza ikeyiki ngodaka ngezona zithako zilungileyo: umhlaba namanzi. Senza iindlela eziqhuma uthuli emthunzini womthi womkhiwane ngeli xesha siwujikeleza siqhuba itrektara zethu zokudlala. Sakha iikhasile ngesanti elwandle, sinyakazise iinzwane zethu esantini. Ngamanye amaxesha sithi sisabaleka, sisuke sikhubeke ezinyaweni zethu sigquduzele siye kuwa bhaxa phantsi emhlabeni!

Abantu abaninzi bawujonge njengento engenamsebenzi umhlaba – ngoku kanye ubaluleke kangaka ebomini kwanjengomoya namanzi. Khawucinge nje ukuba bekuya kuvela phi na okona kutya kuninzi. Imifuno, inyama, iayiskhrimu, iziqhamo....!

Umhlaba usisiseko sento yonke. Umhlaba ungoyena ndoqo wezondlo ezininzi. Izityalo zikhula emhlabeni. Sitya izityalo (umz. iminqathe, ispinatshi, ama-apile, iinqoba nee-ertyisi). Izilwanyana zitya izityalo (ingca, iluseni) nathi sitya inyama yezilwanyana (inyam'egusha, eyenkuku, eyenkomo). Sitya itshizi (isonka samasi), sisela ubisi sitye ne-ayiskhrimu – zonke ezi zinto ziyimveliso yezilwanyana – siyazibulela iinkomo ezitya ingca echumileyo emadlelweni.





Ingaba uyawazi ukuba ngumzila wesiphi isilwanyana lo?
(Do you recognise this animal spoor?)



·Ungazazi iziqhamo ezikwiphepha elingaphambili (iphepha 66).
(Identify the fruit on the previous page).

Ngokufutshane: Ungekho umhlaba singalamba.

Uhlaza olunabileyo olwambese umhlaba:

Uhlaza olwambese umhlaba lwenziwa ngamasuntswana amatye aqhekekileyo akhukhulisekileyo axubene nentsalela yezityalo nezilwanyana ezifileyo. Kanti ke isivatho somhlaba okanye uhla lwenziwe zizinto ezininzi. Amanzi athe yalala phezu komhlaba, abaleka kwentlaninge yamasuntswana ohlaza, kwaye nomoya ungena kulo ngeentunjana ezikulo. Lo moya uzele zizondlo ezibalulekileyo ekwenzeni olu hlaza – unjengomnatha odibanisa uhlaza ukuze lubambane ngokwengubo luwambese wonke umhlaba. Umhlaba ke awuhlali nje ungaphazanyiswa nto engeyoxalenye yayo, koko uxubana nezinto ezikhoyo ebomini, ngakumbi kumaleko wawo ongaphezulu. Ezinye zezo zinto ziyabonakala. Iingcambu zesityalo ziyazika ukubheka ezantsi phantsi komhlaba, kwaye ziya macala onke kanti imisundululu, izinambuzane, iintuku nezinye izilwanyana ziyagrumba apha emhlabeni. Kambe ke azibonakali zonke izinto ezahlala emhlabeni. Ziikhilomitha ngeekhilomitha umngundo onabe phezu komhlaba kube kukho nentaphane yeentsholongwane zohlobo oluyibhakthiriya kwanenyambalala yezinto ezincinane eziphilayo ezingabonakaliyo, ezikho kuyo yonke indawo eziyinkwa ngumhlaba njengendawo yazo yokuhlala.

Uhlaza olwambese umhlaba:

Xa siphonononga uhlaza siphawula ukuba yahlukahlukeneyo imihlaba ngokokudalwa okanye ngokokwenziwa kwayo, oko kuxhomekeke kubungakanani bamahlalutye elite akhoyo kwomihlaba leyo. Awona mahlalutye mancinane kakhulu ngokokude abe anokubonakala phantsi kweliso lemayikhroskophu ngamahlalutye omhlaba ongumdongwe (abonakala ngathi ziithayili zophahla lwendlu). Ukuba sigalela amanzi, lo mhlaba ujika ube ludaka – kwaye uye ube ncangathi ngokokude zixinge izithuthi xa zihamba kuwo. Umhlaba oyintlabathi okanye isanti wona unawona mahlalutye akha amakhulu nahlukeneyo ngobukhulu, njengesanti eselunxwemeni lolwandle. Ungayikha nangesandla uze uyivulele iphume phakathi kweminwe njengeswekile okanye ityuwa. Umhlaba onamahlalutye angemancinane kwaye engamakhulwanga, yaye aziwa ngokuba yintlenga yomhlaba. UMHLABA OVUNDUVUNDU lolona didi lomhlaba lufanelekileyo, wona ke wenziwe ngamahlalutya omdongwe namahlalutye esanti. Kuye kuxhomekeke kubungakanani beSIVUNDISI (izinto ezibolileyo) onazo lo mhlaba. Lo mhlaba uvunduvundu lolona didi luchuma kakhulu lomhlaba. Isanti enohlalutye olukhulu kakhulu iyafunxa (ngenxa yeentunja ezincinane enazo) ngoko ke igcina amanzi amancinci kakhulu. Amahlalutye axineneyo omhlaba ongumdongwe agcina amanzi amaninzi, kodwa uthi ngenxa yokuxinana kwamahlalutye awo ungene kancinane kakhulu umoya ofunwa zizityalo ukuze ziphile. Umhlaba ovunduvundu unamahlalutye afanelekileyo: uya kwazi ukugcina amanzi kakuhle kwaye uneentunja ezifanelekileyo ezingenisisa umoya ngokwaneleyo.

Iindidi zazo zonke izinto:

Imihlaba iyahluka kwiindawo ngeendawo. Uhlobo lwelitye elite larhumka ukwenza umhlaba othile, liba negalelo kudidi lomhlaba. Izityalo ezikhula kuwo nazo zishiya umzila wazo owodwa. Imozulu inendima eyenzayo kwakunye namaqondo obushushu kananjalo nokufuma. Zezi zinto ezibonisa ukuba ibola njani na into. Oku kunegalelo ekuchumeni komhlaba.

Okuphuma emthini:

Umhlaba wasehlathini uchume kakhulu ngenxa yokhula lwendawo. Nakuba kunjalo umhlaba awondlekanga ngendlela elindelekileyo. Imvula enkulu ingabangela ukuba izondlo zomhlamba zikhukhuliseke. Uya kwazi umhlaba ukuhlala uchumile, siyabulela kumaqondo aphakamileyo obushushu nokufuma okukhuthaza ukukhula kohlaza ngokukhawuleza, kwaye kwangelo xesha linye kubola izityalo ezifileyo, eziphinda zibe sisondlo emhlabeni.

Phantsi kwesambrela saselwandle:

Xa uqengqeleka ukuhla uhamba elunxwemeni lolwandle, ubokukhe uqwalasele isanti, uya kubona iintlalutye ezahlukeneyo ngobukhulu, ulwakhiwo lwayo nangombala. Zezi ntalutye



Kuthiwa yintoni igama leziqhamo esikumfanekiso okunombolo 2. (What do you call these fruits?)



Ingaba uyayazi le mithi ukuba ibizwa ngokuba yintoni? (Do you know what these trees are called?)



ke ezisisiseko sesanti yamanxwebe eelwandle. Uya kuphawula ngamanye amaxesha ukuba isanti le ineengcetyana zamaqokobhe oonokrwece. Isanti isoloko iphephetheka, ihamba nomoya namanzi. Imilambo egalela elwandle kunye namaza athi asabalale akufika elunxwemeni ngawo amana ukuyisa napha nangapha.

Ukuba nobumuncu (asidi) okanye ukuba switi (alkhali):

Into ekwabizwa ngokuba yi-pH yomhlaba.

- xa liphantsi iqondo le-pH = umhlaba uba nobumuncu (ubane-asidi)
 - xa liphezulu iqondo le-pH = umhlaba uba switi/mkhuma (ubane-alkhali)
- Kwiindawo apho zina khona kakhulu iimvula, ilayim yomhlaba inyibilika ngokulula ize ikhukhuleseke iwenze umhlaba ubemuncu – (asidi). Umzekelo obonakalayo wolu hlobo lomhlaba ngumhlaba okwindawo enemithi elinywayo yemipayini. Iintyatyambo ii-Azaliya, iirozi, ii-erikha, izadlungu/iziqwane kunye neefeni zithanda ukukhula kumhlaba onobumuncu (one-asidi). Imithi eyimi-Apile neyimiPere nayo ithanda ukukhula kumhlaba onobumuncu (one-asidi). Imizekelo yezityalo ezikhula kakuhle kumhlaba oyi-alkhali (oswiti/omkhuma) yiluseni, ikhaphetshu. Ezi zityalo ziya kwazi ukumelana nelanga elitshisa kakhulu. Zikho ezinye izityalo ezikhula kakuhle kwezinye iindidi zemihlaba. Ingqolowa nombona ikhula kakuhle kumhlaba ongemuncwanga okanye ongeswitanga, koko ophakathi nje, oko kukuthi umhlaba ongena-asidi okanye i-alkhali eninzi. Imizekelo yezityalo ezithanda ukukhula kumhlaba one-asidi okanye one-alkhali eninzi, zizityalo eziyimidumba neziyimimpampiri/ipoplari.

QAPHELA: Izondlo:

Inyama, isonka nemifuno zizinto ezibaluleke kakhulu ebantwini. Kwangandlela ifanayo ukubaluleka kwezondlo – inayitrojini, ifosforasi nephothaziyam ezityalweni. Ezi zondlo zithi zifunxwe ziingcambu zezityalo. Inayitrojini inceda isityalo kwinkqubo yokwenziwa kokutya kohlaza ebizwa ngokuba yifotosynthesis, ngeli xesha yona ifosforasi inceda ngexesha lokuhlana kwezityalo, xa kudubula iintyatyambo, zivelise imbewu neziqhamo. IPhothaziyam yondla iingcambu ukuze zikhule kakuhle.

Ukubambelela:

Umdlaba usebenza njengento exhasa izityalo zibambelele njengokuba zikhula ukubheka phezulu. Iingcambu zisebenza njengendawo yokucina amanzi nezinye izondlo ezivela emhlabeni ezisetyenziswa zizityalo, kwakunye nomhlaba, ukwenza ukutya kwesityalo. Umhlaba ukwakhusela iingcambu xa kugquququka amaqondo obushushu. Phaya ngaphantsi komhlaba, amaqondo obushushu akadli ngokutshintsha ukusuka kwawasemini ukuya kwawobusuku.

Amanzi afunxwa ziingcambu ngoboyana obungathi bubulembu beengcambu obukhula phaya kwiincam zeengcambu. Athi ke la manzi adluliselwe kweyona ndawo ibalulekileyo, le ndawo isisiqu sengcambu, ahambe ngayo ethunyelwa ngaphandle esiqwini sesityalo nasemagqabini. Obona bukhulu besityalo buba ngaphantsi komhlaba! Iingcambu ziyakhula zona side sibe isityalo sifile. Ubungakanani bokucetheka kwanobuninzi bobu bulenjana buyamangalisa. Uphando lufumanise ukuba isityalo esinye serayi sineengcambu ezingaphezulu kwezigididi ezilishumi elinesithathu (13), ezithi zakudityaniswa zenze ubude obungangeekhilomitha ezingamakhulu amathandathu anamashumi amabini anesithathu (623 km)! Iingcambu zezityalo ezilolo hlobo zihla nzulu ukubhekezantsi ngendlela emangalisayo. Iingcambu engunozala wezinye iingcanjana (etephuruthi) yomthi wom-Okii inganobude obuziimitha ezingamashumi amathathu ananye (31 m)! Iingcambu zingayinkathazo ngamanye amaxesha, ngenxa yokukhula zizalise indawo ekuhanjwa kuyo ngeenyawo okanye ziphazamisane nemibhobho yamanzi. Kambe nakuba kunjalo, uncedo lwazo alunakuthelekiseka nengxaki eziyenzayo, ngenxa yokuba izityalo ezibufana neengcambu njengezo ziziindumba (tubers) nezo zizizitswele (bulbs) zikukutya okuphambili ebantwini. Iminqathe, iradishi, iitapile, iibhatata netswele (anyanisi) sisiseko sokutya kwabantu. Ikonomfile (igalikhi) ngokwayo – ikwasisisitswele – kwaye iba sisiqhohli sokutya.



Jonga ukuba ungakwazi na ukuhlola umhlaba kwiphepha 35.

(See whether you can do the soil test on page 35.)

Tyhila kwiphepha 5. Yiba nomfanekiso-ngqondweni uze ubhale izihloko zayo yonke le mifanekiso.

(Turn to page 5. Use your imagination and write captions for all these pictures.)

Ubusazi ukuba?

- Igama uADAMA lithetha umhlaba ngesiHebhere. Igama uAdam ke ngoko ngentetho ethe ngqo, lithetha ukuthi- into eyenziwe ngomhlaba.
- Umhlaba usisiseko sokuphila kuba kuwo apha kukhula ukutya esikutyayo. Umhlaba wathatha iminyaka emininzi ukudaleka, kodwa ngoku uya uphela ngokuphela ngemizwana nje.
- Kunyaka ngamnye kulahleka iitoni ezingamashumi asixhenxe anesihlanu (75 tons) zezigidi-gidi zomhlaba ochumileyo ngenxa yokhukhuliseko lomhlaba.
- Umhlaba ubamba ugcine kuwo umoya omninzi oyikhabhonida-oksayidi oba kwisimo esiyikhabhoni ye-oganikhi ukuze uthinteleke ungaphumeli ngaphandle emoyeni ophefumlwayo.

WHAWU! Umlinganiselo ongamashumi amabini anesibini eepesenti (22%) zomphezulu womhlaba ungasetyenziselwa ukuvelisa ukutya esikutyayo okulinganiselwa kumashumi alithoba anesihlanu eepesenti (95%). Ngaphezu koko – umhlaba awuloncedo nje oluphambili lwendalo olulungiselelwe into ethile kube kuphela.

Kumnandi ukwazi:

Yeyiphi engahambelani nezinye kwezi? (Ungachaza ukuba kutheni ingahambelani nezinye?)



Isadlunge/isiqwane



Ikhala



Irozi



Ifeni



I-azaliya



ISAHLUKO 2

E

ncinane, encinane kakhulu, ecekethekileyo

Ezi zinambuzane zincinane ngaphezu kwento eyaziwa ngokuba incinane, zide zibe ncinane nangaphantsi kwesingxi esisekupheleni kwesi sivakalisi. Ezi zizilwanyana ezincinane kakhulu kanti kukwakho nezinye izinambuzane eziphantsi komhlaba eziceketheke kakhulu ngokungathi ngumnatha wendlu yesigcawu. Akukho mntu unokuzibona ngamehlo enyama, ngaphandle kokuzibona ngeliso lemayikhroskophu. Ngaloo ndlela ke uya kulibona elinye ilizwe lezinto esiphila nazo. Ikomityana nje enye yomhlaba inentaphane yezinambuzane ezincinane kakhulu, izigcawana ezingalingana namangolwane, intsholongwane zebhaktheriya ezincinane ngokugqithisleyo, umgundo nemibungwana emincinane kakhulu ebonakala ngeliso lemayikhroskophu ekuthiwa ziinemathodi (nematodes).





Ehlathini



Isadlunge/isiqwane



Ngoku ke tyila kwiphepha 11. Wakha wasibona esi sidalwa? Le nto ke yile kuthiwa lingolwane lomhlaba xa lijongwe ngento eyenze lalikhulu ngokuphindaohindwe kangagama-556. Likhulu, andithi? Khawucinge ukuba ubumkhulu ungangendlovu! Zama ukuchaza esi sidalwana sincinane ngamagama angedlulanga kwali-100.

Izikelele:

Inemathodi ngelinye igama zibizwa ngokuba yimibungu yohlobo oluyi-roundworm okanye ii-eelworms. Igama u-nematode lisuka kwigama lesiGrike elingu-nema othetha into engumtya. Ezi zinambuzane ziceketheke ngokokude zibe ngaphantsi nakumsonto wentambo yesigcawu. Lo ngumbungu owakha wamncinane kakhulu obonakala ngeliso lemayikhroskophu kuphela. Kambe ke ungabhidiswa bubuncinane bayo obu ungahoyi. Kaloku olu hlobo lweemibungu lukelele/lubukhali kakhulu kwaye luthi luhlasele iingcambu zesityalo. Kuvela amaqhuma angqindilili kwindawo ethi isitshabalalise kuyo isityalo. Ukuba zithe zahlasela indawana ethile yomhlaba ezi roundworms, akungekhe ukwazi nokulima neetapile ezi kuloo ndawo kuba zikukutya kuzo. Eyona ndlela inobulumko yokugxotha ezi roundworms kukutyalala iAfrican marigold enevumba kule ndawo yonakaliswe yile roundworm. Ivumba lesi sityalo liyazigxotha ezi zikelele!

Umaqhingashe womngundo (iraskeli):

Olunye udidi lomngundo ongaphantsi komhlamba obizwa ngokuba yiFayithofera – lo mgundo mbi ukhula kakhulu, kwaye uyachuma bubushushu nakukufuma uze laa mngundo ungumaqhingashe (iraskeli) uhlasele iingcambu zezityalo. Izityalo ezifana nesadlungu/isiqwane kunye neemponyomponyo/avokhodo ziba licham lokuhlaselwa ngumngundo ifayithofera-raskeli.

Ibhaktheriya ezilungileyo:

Ibhaktheriya eluncedo ekulungelelaniseni iNayitrojini iye itsale inayitrojini ehlabeni iyiguqule ilungele ukuba isetyenziswe zizityalo. Ngaloo ndlela ke iba yibhaktheriya enobuhlobo nelungileyo ezityalweni. Ezi 'bhaktheriya zingabuhlobo' zenza amaqhunyana ezityalweni athi afunxe inayitrojini ehlabeni ojikeleze isityalo.

Khawuthi tsi gxada esitiyeni okanye uye kwibala lebhola ekhatywayo okanye elomhoxo ufike ukhangele isityalo esiyiklova okanye isityalo se-ertyisi kwindawo olime kuso imifuno. Tsala ngononophelo isityalo eso usincothule emhlabeni uqwalasele iingcambu zaso. Uya kuphawula ukuba zinamaqhuhuvana amancinane ezingcanjini enziwe yibhaktheriya ejika inayitrojini evela emoyeni ilungele ukugcinwa emhlabeni. Ngummangaliso omncinane wendalo owenza abantu bathi manga kukubona amagqatyanu amane eklova (enqabileyo) esizisa uncendo ezityalweni. Yinkolelo engenakuphikiswa kakade leyo. Kambe ke iklova ikunye nezityalo eziziindumba (njengeluseni, iertyisi, iinqoba ezigrunjwayo, iimbotyi eziyisoy) zizizityalo eziluncedo; ngenxa yokuba ziphucula umgangatho womhlaba. Iklova ikwasebenza njengesilimo esilunge ngokukodwa kwindlelo lezilwanyana ezifuyiweyo. Ngaphezu koko, iklova njengento eluncedo oluphambili, yenza ubusi bunambitheke.



QAPHELA: Ungabhideki!

- Xa zikho emhlabeni izitshabalalisi eziyimibungu yohlobo oluyi-eel, uya kufika iingcambu zinamaqhuma angathi ziintsumpa kwaye ziyaphithana.
- La maqhuhuvana ke abonakala ezingcanjini zee-ertyisi enziwa zezi bhaktheriya zilungileyo zilungelelanisa inayitrojini ikwazi ukusebenziseka.

Umngundo (iFangi):

Uninzi lomngundo oyifangi (umz. iinkowane/amakhowa) avela, aze aphile kwintsalela yezityalo nezilwanyana ezifileyo. Imisontwana/ifilamenti (imisontwana ecekethekileyo ekhulayo) yomngundo/yefangasi iphuma izibambeleli ezifana nentanjana eyenza umnatha wendlu yesigcawu. Lo mnatha uye uyithi wambu yonke indawo eyintsalela yesityalo okanye eyesilwanyana. Ngale

Jonga kwiphepha elinobobo kwiphepha ??? Yintoni igama lesi sixhobo ajonge ngaso umhlotyana wethu? Sisetyenziswa kweyiphi into?





Ubulembu/umngundo



iiLitsheni



Izityalo ezingamavula-ndlela



linkowane ezingamagwegwe

ndlela ke inceda kwinkqubo yokubola. UMngundo wefangi ke ngoko ubaluleke kakhulu ngendima oyenzayo ekuboliseni izinto.

Izitulo zemikholonjane (ii-elves):

Umngundo oligwegwe (izitulo zemikholonjane) uba kwiindawo ezinohlaza olungamagqabi ehlathini kanye kwiziqu ezibolayo zemithi. Lo mngundo ungumhlobo obaluleke kakhulu emhlabeni, kwaye wenza indima ephambili njengesibolisi ehlathini, ukhupha izondlo zemithi emide emva kokuba iwile yaza yafa.

Izityalo ezingamavula-ndlela:

liLitsheni zinjengamavula-ndlela belizwe lezityalo. Kwizityalo ezihluma kwindawo eyomileyo enorhexe/enamatye, izityalo zokuqala, okanye ngaxesha limbi izityalo eziba kukuphela kwazo ezimilayo kule ndawo, ziilitsheni eziye zithi gqa gqa apha naphaya kwiindawo ezinamatye, yaye ziya kwazi ukumila nokuba azimili mhlabeni. Ezi zityalo zingaqhelekanga zivelisa i-asidi enceda ekwenzeni umphezulu wamatye ukwazi ukuqhekeka. Ilitye elirhumkayo kunye nentsalela yeelitsheni lithi kamva lenze ubulembu belitye imosi. Obu bulembu bunendima enkulu ekwenzeni umhlaba apho ezinye izityalo ziye zikwazi ukuzenzela iingcambu khona. Luthi lwakubola olu hlobo lwezityalo zikhula zithi nca phantsi, zigquke zibe yinxalenye yomhlaba

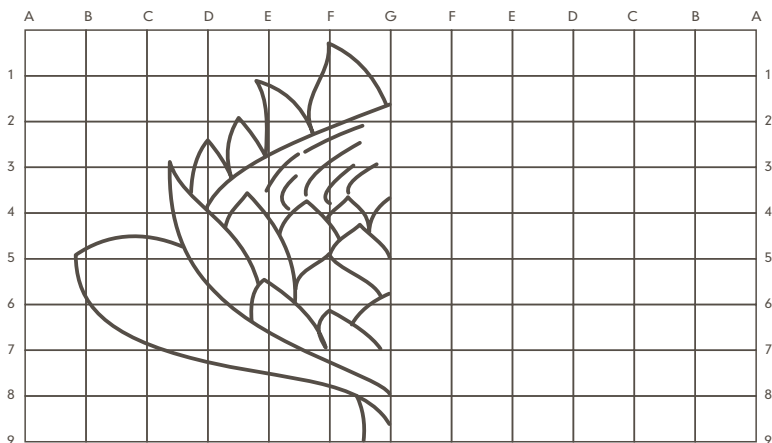
Ubusazi ukuba?

- Ezinye iintaka zisebenzisa ubulembu imosi xa zisakha iindlwane zazo
- Imosi ikhusela umhlaba ngokuwambesa ukuwunceda ungakhukhuliseki.
- Iilitsheni yona isetyenziswa njengedayi, kwaye yenza ilitmus (umchiza ojikwa yi-asidi ube bomvu), eyidayi esetyenziswa ukukhangela ukuba ne-asidi kwento.
- Ingumngundo nayo iyisti eneseli enye le yenza ukuba intlama inyuke.
- Ikwangumngundo nalo ububoya obumpukumpuku oye ngamanye amaxesha uphume esonkeni esidala.

WHAWU! Ikota (25%) yezinto eziphila ehlabathini, iphila emhlabeni.

Kumnandi ukwazi:

Gqibezela lo mzobo wentyatyambo isadlungu.



Uyawabona amangolwane anombala obomvu kula maphepha 13 Kunye 42. Ngoku ke phendula le mibuzo ilandelayo: kutheni ebomvu ngombala? Ingaba atya ntoni? Akunceda njani ukuphilisana kwezinto okanye iekhosistim?



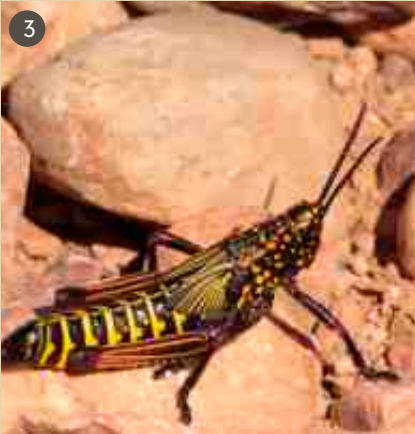
ISAHLUKO 3

U**U**bomi esihamba phezu kwabo



Zikhona kwindawo yonke izinto ezinambuzelayo. Ezinye zazo zisenza sihanjelwe ngumzimba, ezinye zisenza soyike. Ezi zinambuzane sinyathela phezu kwazo sidla ngokuzithumela ngesitshabalalisi-zinambuzane. Okanye sizicumza nangeenyawo, singakhange sicinge kabini ngazo. Ezinye zazo zincinane kakhulu kangangokuba azibonakali nokubonakala emehlweni, ayisathethwa nokuthethwa ke yona eyokwazi ukuba zibaluleke ngantoni na kanene. Kanti ke ezi zinambuzane, ooqongqothwane, 'iirhorho' zihlala kolu hlaza lwambese umhlaba azinakufaniswa nanto ngexabiso lazo. Ngaphandle kwazo ingaphawuleka msinyane into yokuba umhlaba, izityalo, izilwanyana kanti nobomi ngokwabo bungaphelelwa. Ezi zinambuzane zinambuzayo sizoyikayo zisinceda ekucukucezeni kananjalo zingcwabe inkunkuma ezizityalo ezifileyo kunye nentsalela yezilwanyana ezifileyo. Ngaphandle kwazo umhlaba ungaqina uxinane njengelitye. Ngenxa yaloo nto ke azinakubakho nezi tonelana ziphantsi komhlaba ezimbiwa ziintubi, ziimbovane okanye yimibungu, oko kuthethe ukuthi umoya namanzi akayi kubanako ukungena emhlabeni.





Chaza zonke izidalwa ezikule mifanekiso mithandathu 1-6. (Identify all the creatures in these six pictures 1-6). Jonga kwiphepha 17. Thelekisa imifanekiso kwiphepha 81 kunye nale mifanekiso. Ingaba zikhona izinto ezifanayo kuyo?

Imisundululu:

Imisundululu yeyona iphambili ekuMbeni umhlaba kwizinambuzane zonke ezizimba-mhlaba! Imisundululu ngamakhuba aphilayo. Ayinabungcaphephe nje ekumbeni kodwa, koko ikwangabakhi ababaluleke kakhulu. Kwafunyaniswa ukuba kwi-akire nganye enomhlaba olungileyo, imisundululu yiyo ephethula umhlaba ongalinganiswa neetoni ezilishumi elinesibhozo (18 tons) (umhlaba okutshwa yimisundululu kuthelakelelwa ukuba ulingana neendlovu ezisixhenxe) kumhlaba ongaphezulu, iwukhuphela ngaphandle unyaka nonyaka! Le misundululu ikwenza oko ngokuwutya iwuginye umhlaba ivula indlela yawo, kucolwe yonke into ekuloo mhlaba iwutyeleyo esiswini sayo, izinto ezifana oko namagqabi afileyo nezinye izinto ezifileyo ezikuwo, ize iyikhuphe ngokuyityekezela kumhlaba ongaphandle ube njengomhlaba onezichumiso ezininzi. Ngokwenza oko, imisundululu iphucula umgangatho womhlaba ngokwenza kungene umoya namanzi atyhutyatyhutyhe kwootonela zayo. Xa usimba ngomhlakulo esitiyeni isilwanyana sokuqala oya kuthi usibone ngumsundululu.

Lumka!

Ukusuka kwesona silwanyana sincinane ukuya kwesona sikhulu, yonke into esisidalwa ephila emhlabeni ikukutya komnye umntu. Kambe naphaya emingxunyeni akukho lukhuseleko ngokupheleleyo. Amabhungane omhlaba, iinkuma nezinye izinambuzane ezingingelayo zisoloko zikhangela amaxhoba akukutya kuzo.

- linkuma zizalela amaqanda azo kumhlaba ofumileyo, zisebenza kakhulu ngobusuku zizingela imisundululu.
- Oonomanxelana bakha izigu ezikhangeleka okwefanele esantini baze balindele ixhoba phantsi kwesanti leyo ezantsi ekupheleni kwesi sigu (ingayimbovane okanye nokuba sesiphi esinye isinambuzane) esiya kuzifaka kweso sigu. Eso sinambuzane sibe seshweni ke, siba lixhoba lokubanjwa ngumomanxelana ngezo ziminxisi zakhe zibukhali, asitye.
- Amanzi amaninzi kakhulu asoloko eyingozi kwizilwanyana eziphila phantsi komhlaba. UMhlaba omanzi, umzekelo, ukhuphela imisundululu ngaphandle apho iintsizana eziyimisundululu iye ilinde khona ukuba ade acutheke amanzi ngaphantsi komhlaba

Izimba-mhlaba ezincinane:

Abanye oqongqothwane, amabhungane nezinye izinambuzane zomhlaba. ubukhulu becala zibuphila phantsi komhlaba ubomi bazo, ezinye zigumba itonela okanye imingxuma zize zizalele okanye ziwafihle khona amaqanda azo.

- Oonomadudwane besanti bazenzela iindawo zokuhlala emingxunyeni kwimimandla enesanti eyomileyo. Unomadudwane oyimazi uyalithanda ikhaya lakhe – uhlala apho emngxunyeni okanye ahlale kufuphi nawo.
- Imazi yeSigcawu sendlela izalela amaqanda ayo emngxunyeni ngaphantsi komhlaba.
- Uqongqothwane utoktokkie uzalela amaqanda (lilinye kuwo lingangeemilimitha ezintandathu ubude (6mm) kwimingxuma emdibi okanye engenzulwanga kakhulu. Imibungu ithi iqanduselwe emhlabeni. Utoktoki lo ke uye enze ingxolo enkulu enkqonkqozo phantsi emhlabeni ephakamisele phezulu umzimba ongasezantsi ebiza inkunzi. Ithi xa igrumbayo inyenzane embayo ikhuphe iingqumbana zomhlaba ezifana neziduli zentuku. Imingxuma iye ibe ngangemitha yonke ubunzulu. Isandi sokutswitswiza kwayo xa ikhala inyenzane eyinkunzi elolu hlobo isenza intlokoma ephuma emngxunyeni – iba ngathi kutsho isixhotyana esisandisi-lizwi!
- Unomeva wesanti oyimazi wenza indlwana yakhe ngokugrumba itonela elibude bungangeemilimitha ezingamshumi amahlanu (50mm) eliya emngxunyeni wakhe phantsi komhlaba. Uye awududulele emva umhlaba ngentloko nangemilenze yakhe, aze awukhuphele ngaphandle kwale tonelana ngemilenze yangasemva. Emva koku umbundane utsalwa ungene enkulu tonelana uye kufakwa emngxunyeni. Uzalela iqanda libe linye phezu kombundane, ukwenzel'ukuba intshontsho lakhe elisengumbungu litye lakuqanduselwa

Tyhila kwiphepha 52 wenze oku 'Ubuzazi ukuba' - ikhwizi 'uShwankathela'- kunye nekhroswedi.



okanye lakuphuma eqandeni. Ekugqibeleni unomeva udiba ngesanti emlonyeni womngxuma ukuwufihla. Yho! Onjani yena ukukhalipha nokuba krelekrele unomeva mama!

Izinto ezilungileyo nezingalunganga?

Phaya endle, kukho iintubi eziluncedo ekuphumpeni uhlaza nemithi efileyo. Ezinye iindidi zeentumbi zikwayiyo nengxaki enkulu kuba ziyawonakalisa amadlelo, izityalo nezitya kwanezakhiwo ezenziwe ngemithi.

“Umbundane” ligama elibhekiselela kuzo zonke iindidi zeminyiki, apho uninzi lwayo lunemikhwa efanayo. Ebudeni bemini umbundane uzimela phantsi komhlaba uphume ebusuku utye iziqu zezityalo ezisahlumayo.

Iminyikana yezinambuzane ezifana neempukane ihlala kwiitonela phantsi komhlaba.

Imazi yentethe isebenzisa umzimba waye omde ongezantsi ukumba umngxuma onzulu kangangeemilimitha ezilishumi (10mm) emhlabeni ize izalele amaqanda athi aqanduselwe phantsi komhlaba. Athi loo maqanda akuqanduselwa, amantshontsho entethe anyuke ngokubambeleva ngemilenzana yawo enezinto ezibunzipho zokubambeleva andule aphumele ngaphandle.

Imibungu yebhungane imhlophe, kwaye mikhulu kakhulu. Le mibungu idla ngokufumaneka ebulongweni okanye emgqubeni ofunjiweyo. Eminye yale mibungu idla iingcambu zezityalo, ngeli xesha lona ibhungane elindala lisitya isiqu samahlumelo ezityalo kanye apha esikhondweni sesityalo. Ngokwesi sizathu ke zithathwa njengezitshabalalisi-zityalo kwimihlaba elinyiweyo nakwingca etyaliweyo (iloni)

Uninzi lweembovane ludla ngokwenza iindlwana zazo ngaphantsi komhlaba, ngaloo ndlela ke zizenza ukwazi umhlaba ukungenwa ngumoya. Ezinye iimbovane zimba nzulu kangangeemitha ezintandathu (6m) ukuya ezantsi. INkubabulongwe ihlala ebulongweni bezilwanyana ize iqengqe iibhola zobulongwe izimbele phantsi komhlaba. Ngokwenza njalo ezi 'zimba-bulongwe' zincipa ekuchumiseni umhlaba ukuze kukhule izityalo. Ezi zityalo zikhula kulo mhlaba unezi zichumiso ziye zikhule kakuhle.

Ubusazi ukuba?

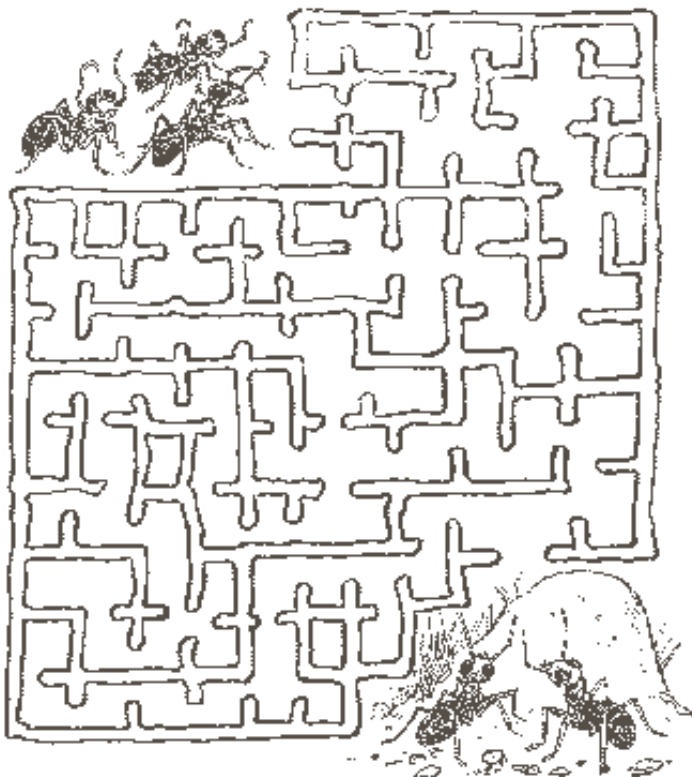
- Imisundululu ayinanyawo, kodwa inoboyana obuncinane kakhulu obusetyenziswa njengemilenze ukuze ikwazi ukubambeleva ngabo ngeli xesha isiya phambili okanye ishwabanisa imizimba yayo.
- Intloko yomsundululu itsolo, kwaye yenza kube lula ukugrumba itonela kumhlaba onamahlalutye angaxinananga.

- Ingafikelela kwizigidi-gidi imisundululu kwisiqwengana nje sehektare enye yomhlaba (indawo engangangesiqingatha sebala lombhoxo/lebhohlekhatywayo).

WHAWU! Owona msundululu wakha wamde ehlabathini wafunyanwa eMzantsi Afrika – wawungangeemitha ezintathu ezineesentimitha ezingamashumi amathathu anesihlanu ubude (3.35m)!

Kumnandi ukwazi:

Nceda iimbovane zifikelele kubahlobo bazo.



Uyambona uqongqothwane kwiphepha 79 Uyayazi ingoma kaqongqothwane? Yenziwe zizandi eziphindaphindayo zeziqhakancu zesiXhosa. UMiriam Makeba, imvumi yodumo yaseMzantsi Afrika wayenza le ngoma yaduma.

I-gqi-rha len-dle-la ngu-qo-ngqo-thwa-ne (x2)

E-be-qa-be-le-gqi tha-pha-ba-thi ngu-qo-ngqo-thwa-ne (x2)

Ngoku ke fundisa abahlobo bakho le ngoma imnandi kaqongqothwane yesiXhosa! Kufuneka ube Nomonde xa ubafundisa ukuze bazifunde ngokuchanekileyo zonke izandi zeziqhakancu.



ISAHLUKO 4



Ukuqhekeka koMhlaba

lintaka, amafudo, amaxoxo, iinyoka, imikhombe kunye nazo zonke ezinye izilwanyana – ukusuka kwezikhulu ukuya kweyona mpukwana incinane, zonke zixhomekeke emhlabeni. Ezinye zazo zizenzela iindlwana zazo ngomdongwe kwiimfanta eziseluphahleni lwendlu, kanti ezinye zihlala kwiitonela ezingaphantsi komhlaba zikhulisele kuzo amantshontsho azo. Njengoko uhlaza lulikhusi, isisele okanye idladla okanye indawo yokugcina ukutya, nawo umhlaba ngowokukhulisela kwanendawo yokuhlala ekhuselekileyo emomiyeni nakwimozulu. Ezinye zithanda umhlaba omanzi ukuze zizibhuqe kuwo.

Udaka ummangaliso:

Imikhombe emhlophe iyakuthanda ukuqubha eludakeni. Udaka lukwasisivuthululi-makhalane oluthi lwakoma awe, kuba nazo ezo zifunxi-gazi zingathandekiyo zifumana izindlu kwakulo mhlaba okwazo! Iinyathi ziyakuthanda ukuzipholisa emachibini odaka ngemva kwemini eshushu yehlobo. Ingulube nayo iyayazi into yokuba ukuzibhuqabhuqa eludakeni yinto emnandi nenempilo kuba udaka luyapholisa kwaye lukhusela isikhumba sayo kumanxetyana enziwe kukuluywa zizinambuzane.





Singoobani? 1-5

Izindlu zodaka:

Inkonjane iyakha indlwane yayo ekoneni yeverenda. Imbonakalo yale ndlwane ifana ne-iglu (eyindlu yamaEskimo) enomnyango ojonge ezantsi, kwaye yakhiwa ngezicukwana zodaka. Indlwana yodaka yenkonjane yenziwa ngezicukwana zodaka ezifikelela kumawaka amahlanu (5000) nangaphezulu xa sukuba kusakhiwa iindlwana eziphakamileyo, kwaye ezi ndlwana zihlala iminyaka emininzi zingonakalanga.

Amahodi anikisa ngemingxuma yawo:

Amadada asendle (Shelducks) azalela ebusika kwaye asebenzisa imingxuma emikhulu eseyigrunjwe zezinye izilwanyana ezifana nehodi (isidla-mbovane), incanda, nomvundla. Lo ngxuma ugrunjwa ube mde ude ufikelele kwelinye igumbi elikhulu eliba sekupheleni komngxuma – ngamanye amaxesha ukhe ube nobude obungangeemitha ezilithoba (9m) ukusuka emlonyeni womngxuma– liwazalela kule ndawo idada lasendle amaqanda alo nadla ngokuba lishumi (10).

IiNtaka zobusi zintaka ezithanda iindawo eziphezulu, zidla ngokwakha iindlwana zazo phezu kwendlu yehodi (isidla-mbovane).

Izindlu zamahodi esezisebenzile ziye 'zisetyenziswe' zizilwanyana ezininzi ezifana nodyakalashe omthendevu kunye neengulube (iihagu zasendle). Ezi zilwanyana ziyisebenzisa imingxuma yehodi njengamakhaya azo okanye indawo yazo yokuzimela. Imazi kaxam izalela amaqanda ayo ngaphakathi esidulini seentubi eziphilayo. Uxam umba umgxuma oya ngqo kwindawo ezihlala kuzo iintubi aze azalele apho amaqanda angamashumi amathandathu (60). Iintubi ziye ziququzele ziyilungise indawo yazo ukuze amaqanda kaxam ahlale kakuhle endlwaneni. Aye ahlale ngokukhuselekileyo amaqanda kule ndawo. Kuthi emva kokuna kwemvula aqanduselwe, amantshontsho kaxam aye ombe ngokwawo aphumele ngaphandle ngenxa yokuba isiduli sithambile ngenxa yokuna kwemvula!

Abahlali baseziFlethini:

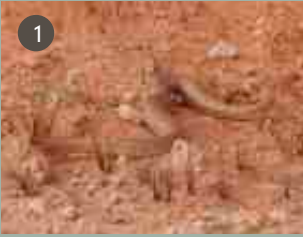
Unomaphelana yintaka edla izinambuzane ezibhabhayo (Carmine) esebenzisa imiqobo eyisanti emlanjeni ngokugrumba iitonela ukuze izalele kuzo amaqanda ayo. Xa zithe zafikelela kuma-5000 ezi ntaka ziye zenze iitonela zokuzalela enyeleni yomlambo. Inkangeleko yezo ndlwana iba ngathi zizakhiwo eziziflethi!

Abombi nabaxhoxhi:

- Amaxoxo ahlala ngaphantsi komhlaba ubukhulu becala. Emba esebenzisa imilenze yawo yangasemva ukududula umhlaba, ngokwenza oko aya esithela ngokusithela ngaphantsi komhlaba.
- Unomademu (shovelnose frog) – njengoko negama lesilungu lisitsho! Eli sele limba ngentloko kuqala, lisebenzisa incam yomlomo wayo otsolo oku komhlakulo osisikupu.
- Ihodi (isidla-mbovane) lomelele kakhulu yaye linemikhono/imilenze yangaphambili eqinileyo neempuphu ezibukhali elithi ligumbe ngazo indawo yayo yokuhlala ngomzuzwana. Ngezo mpuphu zalo liya kwazi ukumba isiduli seembovane likhangele ukutya kwalo elikuthanda kunene – iimbovane neentubi.
- Iintuku zifumaneka kwihlalathi liphela kodwa kunqabile ukufane zibonakale, ngenxa yokuba zihlala phantsi komhlaba ubomi bazo bonke. Njengokuba zigrumba iitonela zikhangela imisundululu, ukutya okuzizinambuzane nezitswele, ziye ziwududule ngendlela emangalisayo umhlaba ziwukhuphela ngaphandle ngeempuphu zazi ezibukhali nezizibhexe okweenyawo. Lo mhlaba uvunguziweyo ujulwa ngaphandle wenze iziduli. Xa ubona iziduli zentuku kwiloni yakho yazi ukuba kukho ubomi obuphantsi komhlaba.

Iindawo zokubalekela:

Izimba-mingxuma ezininzi ziye zenze iindawo zokungena nezokuphuma phantsi komhlaba ukuze zikwazi ukubaleka iinyoka noodyakalashe.



Ixesha lokulala:

Iindubule zizimela phantsi komhlaba ixesha elininzi enyakeni ziphume kuphela xa zifuna ukutya zize xa iqalisa ukuba imvula ibe lixesha lokuzalwa kwezabonkolo/ amantshontsho azo. Ubude bemingxuma yazo bungangangemitha ukubheka ezantsi kumhlaba oyisanti. Xa kome kakhulu kunqabe imvula, zihlala phantsi komhlaba iminyaka emininzi.



Isifukamiselo:

Amafudo azalela amaqanda awo kwindawo evulekileyo emhlabeni apho imazi iye igrumbe izalele igqumelele ngomhlaba ngendlela engaqhelekanga noxa ikhuselekile nje. Oko ikwenza ngokugangatha ngamanqina angasemva, ibhambatha umhlaba ulale phezu kwindawo ebeke kuyo amaqanda ayo 'esisifukamelo'. Athi akuqanduselwa la maqanda ambhoxo, amantshontsho ofudo aphume ngokugrumba ngokwawo.

Imazi yesikhotsholo ivula indawo kumhlaba ofumileyo phakathi kwamagqabi ize izalele amaqanda amakhulu athambileyo alishumi elinesihlanu (15) amaqokobhe awo asisikhuselo esibuthwathwa. Ihlala kufuphi nendawo ezalele kuyo igade ilindele ukuqanduselwa kwamantshontsho ayo. Athi akuqanduselwa akwazi ngoko nangoko ukuzikhathalela ngokwawo kwaye athi evela nje abe seziinyokana ezinetyhefu eyingozi.



Ilali ephantsi komhlaba:

Amagala aya kwazi ukumelana, yaye aphile kwiindawo ezome kakhulu. Agrumba iitonela ezibheke ezantsi ukuze kuthi kwakuba shushu kakhulu, abaleke aye kuzipholisa kwindawo yawo epholileyo. Le 'mizi' ingaphantsi komhlaba ayigrumbayo iba 'namagumbi' amaninzi anxibeleleneyo. Kubakho neendawo ezininzi zokuphuma. Amagala akhe ahlale kunye nolunye udidilungumzala wawo ekuthiwa yomongoose kwakunye noonomatse (izikwireli).

Ubusazi ukuba?

- Ibuzi lasentlango (Hairy-footed gerbil) elinemilenze enoboya lihlala ubukhulu becala kwiindawo eziyintlango, kwaye anoboya obuninzi ezinyaweni – njengoba negama layo lesilungu lisitsho. Oku kulanceda likwazi ukuhamba lula kwiinduli zesanti kwaye bukhuselela iintupha zalo ebushushwini besanti.
- Iingulube (izidla-mbovane) ngamanye amaxesha ziye 'ziluvale ucango' zakuba ngaphakathi emingxunyeni yazo ngokubeka into evalayo kwiitonela zazo – mhlawumbi zenzela ukuvala 'izibhadubhadu' ezingalindelwanga.
- Iintuku azizityi izityalo ezizitwele ezizivunayo, koko zizigcina ekupheleni kwemingxuma yazo (izitwele ezilinganiselwa kumawaka amahlanu (5000)

Yeyiphi eyona yona? 1-3

Tyhila kwiphepha 57 Khawuchaze zonke ezi zilwanyana. (1-3)

njengokutya! Kuye kuthi xa kungakhange kusetyenziswe oko kutya, ezo zitswele ziphinda zihlume ziphumele ngaphandle zikhule.

- **Inkwakhwa** imba emhlabeni oyisanti izingela iintuku. Khawube nombono wayo iwuvula kakhulu loo mlomo wayo iginya ixhoba layo (ngamanye amaxesha elo xhoba layo/ukutya kwayo kuba kukhulu kangangomvundla!) Nokuba ingankulu kangakanani na inkwakhwa, kodwa intlokwana yayo incinane kwaye itsolo, ingangeesentimitha ezintathu (3cm) ububanzi. (Inkwakhwa iqala ngokulufuthanisele ixhoba layo ngaphambi kokuba ilitye).

WHAWU! IiNtuku zinamazinyo okuluma amade abukhali asebenza njengezixhobo zokugrumba, kwaye ayayinceda intuku ikhuphe umhlaba olinganiselwa kwiitoni ezimbini (2 tons), oko kukuthi amawaka amabini eekhilogram (2000 kg) zomhlaba (oko kungalingana neebhaki/iiveni ezine zomthwalo womhlaba) kwihekthare nganye (masithi into enokulingana nebala lebhola yombhoxo ubukhulu) ngonyaka!

Kumnandi ukwazi:

Dibanisa amachaphaza ngomgca – 1 ukuya kuma 42 – ubone ukuba ngubani lo uzimele ngelitye.





ISAHLUKO 5

U mzila wabantu



Faka iinyawo zakho kwisichityana samanzi. Ngoku ke khawunyathele kwindawo esanyentiweyo okanye egangathwe ngezitena (ipheyivingi) wandule ujonge umzila weenyawo zakho ezimanzi uzobeka ngasemva...

Naphi na apho sihamba, sibaleka, sichophe okanye sime khona, sishiya imizila yeenyawo zethu. Imizila yeenyawo ezimanzi yoma kwangoko ize emva kwexeshana iphele ingabonakali. Xa sihamba elunxwemeni lolwandle siye sithi sakujonga ngasemva sibone imigca yemizila yeenyawo zethu, ade abe amaza olwandle ayicima kancinane kancinane ide iphele.

Sishiya imizila yeenyawo kuyo yonke indawo esinyathela kuyo emhlabeni. Eminye icimeka lula ize ishiyeke isanti okanye umhlaba undindene kwakhona. Eminye ke imizila yeenyawo zabantu iba negalelo elikhulu ibangele umonakalo omkhulu.

Ikhangeleka njani le mizila itshabalalisayo size senze ntoni ngayo?





Funda kwisahluko 5 ucinge ukuba zingathini izahloko ezifanele le mifanekiso

Tyhila kwiphepha 29 Uyasibona esi sitiya? Ngoku ke khawucinge yonke imifuno onokuyolima esitiyeni sakho. Yeyiphi imfuno oyithandayo? Yeyiphi ongayithandiyo? Umntu usenokuba nesitiyana sokutyala iziqhamo nemifuno – yiyiphi imizekelo onokucinga ngayo?

UKhukhuliselo lomhlaba: Ukuba uyazincothula izityalo emhlabeni, umhlaba uya kukhukhuliseka ngokulula. Imvula ezinkulu zigrumba imijelo enzulu kwindawo ezithambekileyo ezingakhuselwanga, uze umhlaba ongaphezulu ube sesichengeni sokukhukhuliseka. Umoya nawo, uyawukhukhulisa umhlaba ongaphezulu, ngakumbi ngamaxesha embalela. Ukungaphathwa kakuhle komhlaba, ukufudukela ezidolophini kunye noguquguquko lwemozulu, ezo zinto zinegalelo ekubeni umhlaba ube nokukhukhuliseka lula. Ukwanda kwabantu kunyusa iqondo lobunzima ezifameni. Ukuba ukhukhulisekile umhlaba, kuthetha ukuba umke umphelo.

Ukwenza icebo:

- Kufuneka siwubambe umhlaba. Eyona ndlela ilungileyo kukulima izityalo. Ukwangeza koku, elona cebo lililo kukulima izityalo ezidalelwe ukukhula kuloo mmandla – umzekelo izityalo ezityumtyum ezigcina amanzi kummandla weKaroo naseKlein-Karoo kunye nefynbos kummandla wonxweme lwaseKapa nasezintabeni. Izityalo eziyinkulelane yendawo ethile zizityalo ezidalelwe ukuba zilungele ukukhula kummandla othile nezingqinelanayo nemozulu yommandla lowo.
- Ingalicebo eliphilileyo nokuziqalela isitiya sakho semifuno – nokuba sisiqithana nje esincinane ngasemva eyadini yakho. Amathanga, iimbotyi nelethisi ozivune esitiyeni sakho zingamnandi kakhulu, akunjalo na? Ngaphandle koko, imifuno oyilime yazikhulela esitiyeni sakho inempilo kananjalo.
- Tyala umthi ukuze kubekho umthunzi ehlotyeni nendawo apho zingazakhela iindlwane khona intaka, kwaye kwangaxeshanye imithi ibamba uhlaza olwabese umhlaba lungakhukhuliseki.

Ezinye iindlela eziluncedo ekubambeni umhlaba ungemki kumhlaba wolimo:

- Kukulima izinto ezibizwa ngokuba 'izityalo ezizikhusele-mhlaba' ezikhula ngokukhawuleza ezifana neklova ethi iwubambe umhlaba osaphunyuzwe ekulinyweni.
- Kukulima ngokunqumleza ulandela ii-ankile kwindawo elithambeka kunokulima imiqolo ehlayo kwindawo enjalo, kunceda ukumka komhlaba yakuna imvula.
- Kukulima ngokwamanqwanqwa (njengezitepsi- terracing) ukuthintela ukukhukhuliseka komhlaba ongaphezulu.

UNGcoliseko:

Izitshabalalisi-zinambuzane eziyiKhemikhali zingatyhefa umhlaba ekuhambeni kwexesha. Nangona izitshabalalisi-zinambuzane zibulala izinambuzane ezingafunekiyo, kodwa iyaphazamiseka inkqubo yokuxhathisa yendalo yomhlaba. Izitshabalalisi-zinambuzane zikwabulala nezinto ezibalulekileyo ezininzi ezisemhlabeni zize zincede ekwenzeni ikhomposti. Isichumisi esiyifethelayiza naso siya kwazi ukuyiphazamisa inkqubo yokuxhathisa yendalo yomhlaba.

Zama icebo: Indlela yendalo yeyona ndlela ilungileyo. Eyona motho ifanelekileyo yokukhuthaza ukukhathalelwa komhlaba inokuthi: Live green (Khathalela uHlaza). Zenzele eyakho ikhomposti – umntu wokwenene uya kwazi ukwenza umgquba (imifuno ebolayo nenkunkuma okanye umgquba wezilwanyana).

- Inkunkuma yendlu neyasegadini efana namaxolo emifuno neziqhamo, iitibhegi ezisetyenzisiweyo, amakhoba amaqanda, ingca esikiweyo nomgquba osewubolile wezilwanyana zasefameni zezona zilungileyo kwikhomposti
- Ikhomposti ichumisa umhlaba kwisitiya semifuno okanye esesityatyambo
- Ikhomposti ikwindawo yesibini ethi ibe 'uhlaza olwambese umhlaba'
- Ikhomposti inceda ekuvuseleleni ngokutsha izindlo ezibalulekileyo ebezikhe zasebenza, kwaye iphucula umgangatho womhlaba
- Izityalo ezilinywe kumhlaba ochunyiswe ngekhomposti zinezakha-mzimba ezininzi kwaye zinempilo. Abantu abatya ezi zityalo (imifuno, iziqhamo neenqoba) bahlala besempilweni kwaye baphila 'ngohlaza'
- Phantsi kwayo nayiphi na into erhoqozelayo okanye ebhubhuzela ibhabha kwimfumba yekhomposti iluncedo kuba ezo zinto ziyinxalenye yendalo kwinkqubo yokubola kwezinto eziyi-oganikhi.
- Ungakulibali oku: Umgquba oyikhomposti ufuna umoya. Hlokhla uphakamisa imfumba yomgquba ngefotsholo ukuze kungene umoya. Izichumisi zezityalo kufuneka zingabimanzi, koko zifume. Amaphepha-ndaba nawo akulungele ukwenza ikhomposti. Krazula amaphepha abe

ziziqwengana, waxube nemvuthuluka yamagqabi ayinkunkuma yemithana ebichetywa kunye nenye inkunkuma eluhlaza, uzenze zonke izinto ozixubayo zilingane ngokomlinganiselo. Wugalele amanzi umxube wakho ngekani lamanzi (watering can) udibanise kwimfumba yakho yekhomposti.

Kunokuba usebenzise isibulali-zinambuzane, cinga ngohlaza.

- Lima ibhezili phakathi kwemiqolo yeetumata, iskwashu, amathanga nemixoxozi. Ayiniki nje ubuncwane bendalo emifunweni, koko igxotha nezinambuzane.
- Ukuba ulima izityalo zasebusika phantsi kweerozi, iintwala zemithi kunye nomngundo awubikho.
- I*Rozimeri* ibizela iinyosi namabhabhathane esityeni sakho.
- I*Pasli* ungayilima ecaleni kweerozi neetumata ukugcina imithi yakho yeerozi ingahlaselwa zizinambuzane nazizitshabalalisi zezityalo. I*Pasli* isebenza nangesinongo kwizidlo ezahlukeneyo.
- Lima izityalo eziyi-nasturtiums ecaleni kwebrokholi kuba iyazigxotha iintwala zemithi. Ziyawugquma nomhlaba kwangokunjalo xa ziphakathi kwezityalo ezifana nombona, itumata nekaphatshu.

Ukulayihla nje inkunkuma:

Inkunkuma eqinileyo efana neentsimbi, iiplastiki, iiglasu namacangci amadala enza ungcoliseko lomhlaba nemondalo

Ungenza ntoni? Yivuselele ngokutsha!

- Gcina umgqomo owodwa wenkunkuma ekhitshini ukuze ulahle kuwo zonke iiplastiki ezisebenzileyo ezifana neetoti zeeyogathi, ezemajarini, eze-ayiskhrimu namakhoba obisi.
- Omnye umgqomo wenkunkuma wubekele ukufaka inkunkuma yezinto zonke ezenziwe ngeglassi, amakhoba enziwe ngeglassi, iibhotile, nezinye izinto zokuphatha ezikwanjalo.
- Beka nomnye umgqomo wenkunkuma oyenziwe ngemveliso yamaphepha asesebenzile, umzekelo iibhokisana ezingenanto zesepha engumgubo nawesiriyeli, iipakethe zamaphepha eeswiti ezingenanto – kunye namaqokobhe ephepha langasese.
- Omnye umgqomo ungawusebenzisela ukulahla inkunkuma yemveliso yezinto ezizitoti, njengeetoti zokutya okunkonxwayo, ezeziselo nezinye izinto ezikwanjalo.

Thwala yonke iinkunkuma yakho uye kuyivuselela ngokutsha kwidepho ekufuphi nawe eyenza loo msebenzi. Le nkunkuma iya kubekwa esikalini ukujonga ubunzima bayo uze emva koko ufumane imalana ngenkunkuma yakho vuselelwa ngokutsha. Zonke izinto eziyinkunkuma zekhaya lakho ziya kuphinda zisetyenziswe endaweni yokuzilahla jwii phaya zigqibele ngokonakalisa umhlaba.

Ubusazi ukuba?

- Ikhomposti ingumhlaba onokuwenza.
- Umhlaba kungoku nje ukhukhuliseka ngokukhawuleza ngokuphindeke kangangezihlandlo ezingamashumi amabini (20 times) kunaxa usenzeka.
- IPholistayirini, luhlobo lweplastikhiki enegwebu ehlala ixesha elifikelela kumakhulu amahlanu (500) eminyaka. Ayifane ikrazuke, kwaye akululanga ukuyivuselela ngokutsha, ngenxa yokuba kubiza imali eninzi kakhulu ukwenza loo nto. Ngoko ke xhasa imizi-mveliso engasebenzisi olu hlobo lweplastikhiki.
- NgoJuni wawama-2015 uPope Francis wathetha la mazwi alandelayo: “The earth... is beginning to look more like an immense pile of filth.” oko kukuthi, ‘umhlaba ... uyaguquka uba yimfumba nje yenkunkuma.’

WHAWU! Umlinganiselo wenkunkuma eyenziwa nguMzantsi Afrika ngamakhulu amahlanu anamashumi amahlanu ekhilogrem (550 kg) - ngonyaka.

Abantu bahlala apha:

Sisebenzisa umhlaba ukwakha izindlu, iicawe, izikolo, izibhedlele, iindlela, iiblorho, amadama, imizi-mveliso nokunye. Apha kweli lizwe lethu imizi eyakhiwe ngokwemveli yenziwe ngomhlaba ongumdongwe yaza yafulelwa ngengca. Iingqayi esizisebenzisayo kumakhaya ethu zenziwe ngomdongwe.

Umhlaba emhlabeni:

Umhlaba usisiseko sayo yonke into. Uyintsika yethu, kwaye usenza sikwazi ukuma singawu xa sinyathele phantsi kuNozala uMhlaba. Sidalwe ngomhlaba kwaye siya kubuyela lwasemhlabeni sakufa.

Njengoko eyibeka ngobuciko obukhulu uMufasa ethetha noSimba we- Disney's The Lion King (uSimba, uKumkani iNgonyama): "Everything you see exists together in a delicate balance... from the crawling ant, to the leaping antelope... When we die, our bodies become the grass and the antelope eat the grass. And so, we are all connected in the great Circle of Life." Oko kukuthi, 'Yonke into oyibonayo iyaphilisana, kwaye ithubeleza phantsi kwamanzithinzithi obomi... ukusuka kwimbovane enambuzelayo ukuya kwinyamakazi etsibatsibayo... Xa sisifa, imizimba yethu iba yingca ize ityiwe ziinyamakazi. Ngoko ke siyaphilisana kuMjikelezo wabo uBomi.'

Kumnandi ukwazi:

Nceda abahlobo bethu bafumane izinto ezilishumi elinesine ezingezozasendle



Tyhila kwiphepha 63 Uyayibona le foto yomgquba oyi-oganikhi? Cinga ngazo zonke izinto ezenziwe nge-oganikhi eziluncedo olukhulu ekwenzeni umgquba oyi-oganikhi uchume.

Bykomende antwoorde / Extra answers / Impendulo

[illegible]

Antwoorden - Impendulo

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Dankie! Thank You! Enkosi!

- Die Departement van Landbou (Junior LandCare) van die Wes-Kaap vir die finansiële ondersteuning.
- Francis Steyn van Dept Landbou vir die blink plan en geesdrif vir die projek.
- Vuyokazi Stofile for the Xhosa-translation and proof reading.
- Susanne Marais en Jan Vlok vir hul kundige hulp en kennis.
- Ds Wilmar Matthee, CapeNature en Louis Jordaan vir foto's.
- Gerhard Marx vir illustrasies.
- Christina Coetzee en Yvonne Robinson vir proefleeswerk (Afrikaans en Engels).
- Louise van Zyl (Mosprint) vir die bladuitleg.
- Soete Palm se mense vir jul omgee.

