UMBONO, UHLELO, UYILO
Inge Dehennin, Roland Perry, Dora Scott, Nic Smol

IMIZEKELISO
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UKUHLELA IMIZOBO
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IGUQULELWE NGU
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UMPAPASHI
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GHENT UNIVERSITY
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Ukusuka kuA ukuya kuZ,

linemathodi ziqaqambisa ubomi bethu!

Incwadi yombala kunye namabali malunga ne nemathodi

Ukususuka ku A ukiya ku Z,

Iinemathodi ziqaqambisa ubomi bethu!

Iintshulube ezingqukuva, iintshulube ezitsolo, iintshulube ezibumsonto, iinemathodi: ngubani okhe weva ngazo?

Nangona bebambalwa nje abantu abaziyo ngazo, zikuyo yonke indawo kwaye zininzi: phakathi kwesanti, ngaphantsi kweenyawo zakho xa uhamba elwandle, kumazambane esitiyeni sakho, ezinzulwini zolwandle nasemajukujukwini!

Iinemathodi zingaba ncinci kangangokuba zibonakale ngemakroskopu kuphela okanye zibe nde kangangeemitha ezibalekayo. Zaziwa kakhulu ngenxa yomonakalo eziwubanga kwizityalo yaye zihlasela nezilwanyana kwakunye noluntu. Kodwa ke, ezinye iinemathodi zibaluleke kakhulu kulawulo lwenkqubo yendalo, ukwenziwa kwemilinganiselo yomgangatho womhlaba nowamanzi kwakunye nokwazi inkqubo yokwaluphala.

Le ncwadi yokufaka imibala, eyenziwe ngabaphandi ngeenemathodi, ikwazisa kwihlabathi eliqulethe iintlobo ngeentlobo zeenemathodi yaye ikwakubonisa ukusuka kuA ukuya kuZ wezizathu zokuba iinzululwazi zizibone zisonwabisa yaye zinika umdla ezi zilwanyanana.

Astronaut - Usomajukujuku

Xa oosomajukujuku behleli emajukujukwini ixesha elide, izihlunu zabo ziye zibe buthathaka kwaye oku kungabangela umonzakalo ngexesha lomsebenzi. Intshulube engqukuva i*Caenorhabditis elegans* iluncedo kwiinzululwazi kangangokuba iinzululwazi zagqiba ekubeni zithathe ezi zilwanyanana zizise emajukujukwini ukuze zizisebenzise njengomlumiso ekuya kufundelwa kuwo banzi ngobuthathaka bezihlunu.

Ezi ntshulube zade zasinda nakwingozi embi yesiphekepheke sasemajukujukwini saseKholombiya ngenyanga yoMdumba ka2003. Zafunyanwa ziphila kwimibhobho yealuminiyam eyayintlitheke kwintlango yeTexas.

Izizukulwana zezi ntshulube zathunyelwa kwakhona emajukujukwini ngo2011. Kweli ityeli lwaqukumbeleka ngempumelelo uvavanyo lobuthathaka bezihlunu.

NASA
C. elegans

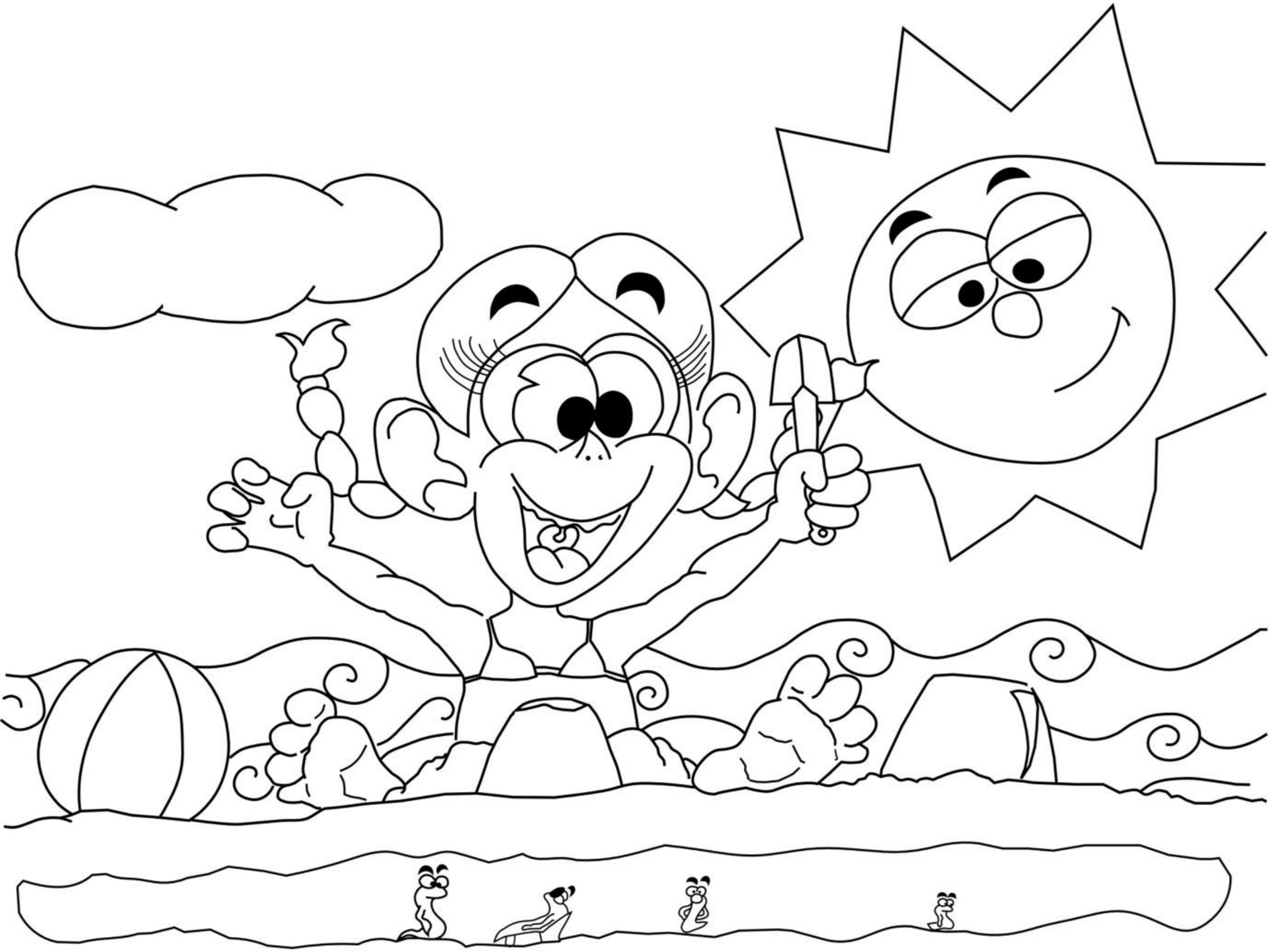
Beach - Ulwandle

Ubona ngathi le santi yaselwandle ayinanto kwaye ayinabomi? Imbonakalo iyalahlekisa ke maxa wambi!

Ngaphantsi kwetawuli yakho, iintshulube ezincinci ziyanyakazela kwi santi. Kwixa elizayo, xa usakha inqaba yesanti ugrumba isikwere sika5 ngo5 mitha, yazi ukuba uphazamise malunga neenemathodi ezingamashumi amahlanu ezigidi. Hayi nje uhlobo olunye, kodwa mhlawumbi iintlobo ezingamashumi amahlanu!

Ezi ntshulube zitya ubulembu, iintsholongwane, kwanezinye iintshulube.

Ewe, kuye kubekho imiboniso enomtsalane ngaphantsi kwetawuli yakho yokuhlamba, mhlawumbi ziqaqambe kanye njengezo zikumathafa aseAfrika aneengonyama, amaqhude kunye namaqwarhashe nto nje zincinane ke zona.



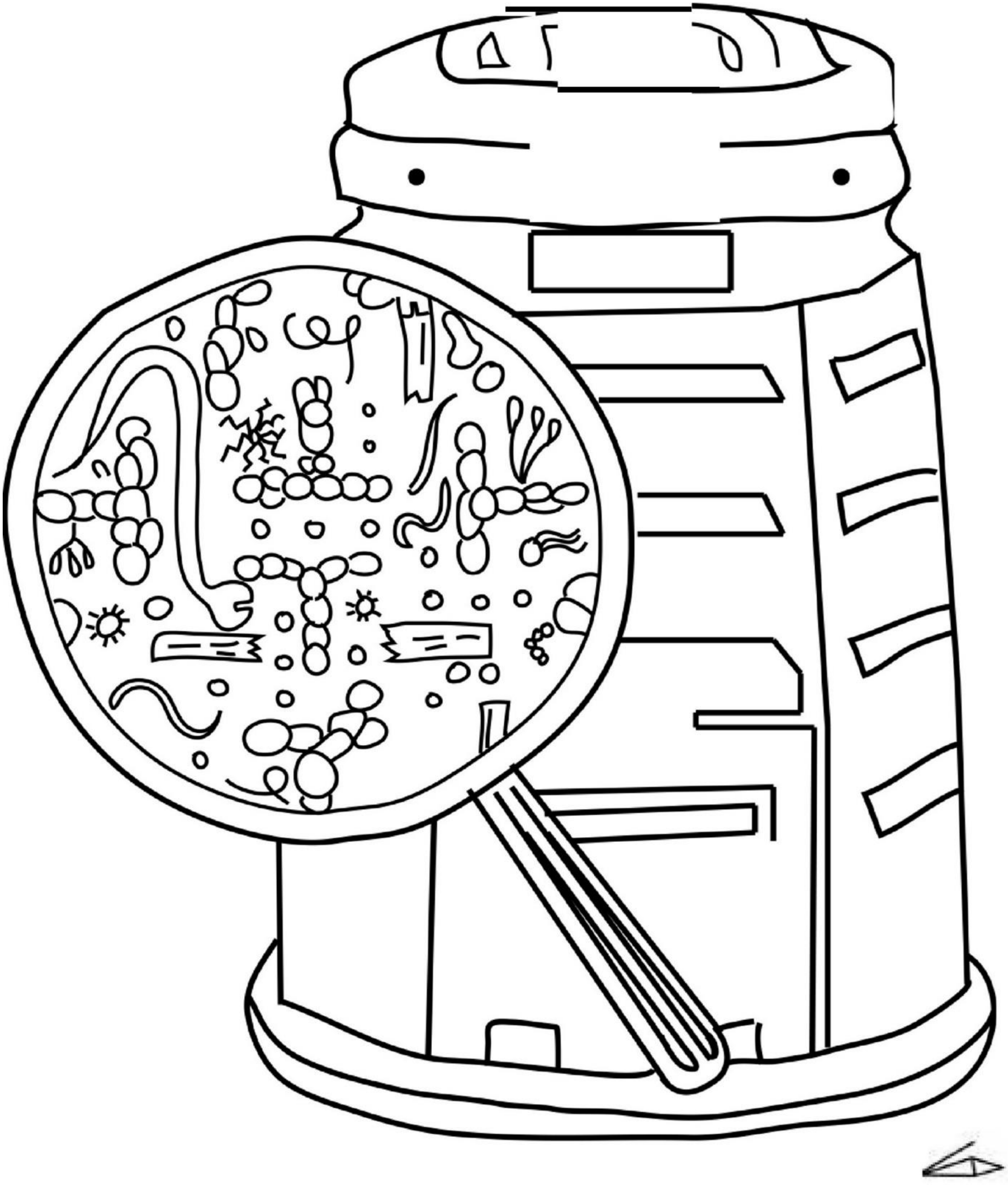
Apolônio

Compost - Umgquba

Umgquba uzele bubomi!

Iintsholongwane, umngundo, amangolwane, amasongololo, nentshulube ezingqukuva zisebenza kunye ukuvundisa inkunkuma nokugcina izitako ezixabisekileyo. Ezinye zezinto eziphilayo zincinane kangangokuba ungangaziboni ngeliso lenyama. Kufuneka usebenzise iindondo zokukhulisa okanye imakroskopu. Ukugcina umgqomo wenkunkuma egadini yakho kuluncedo ngoba ungaguqula imifuno, iziqhamo inkunkuma yegadi ibengumgquba obalulekileyo. Xa ugalela lomgquba emhlabeni, izityalo zakho zikhula ngcono kakhulu.

Amagciwane, yndlela entle yokuyisebenzisa kwakhona andithi?

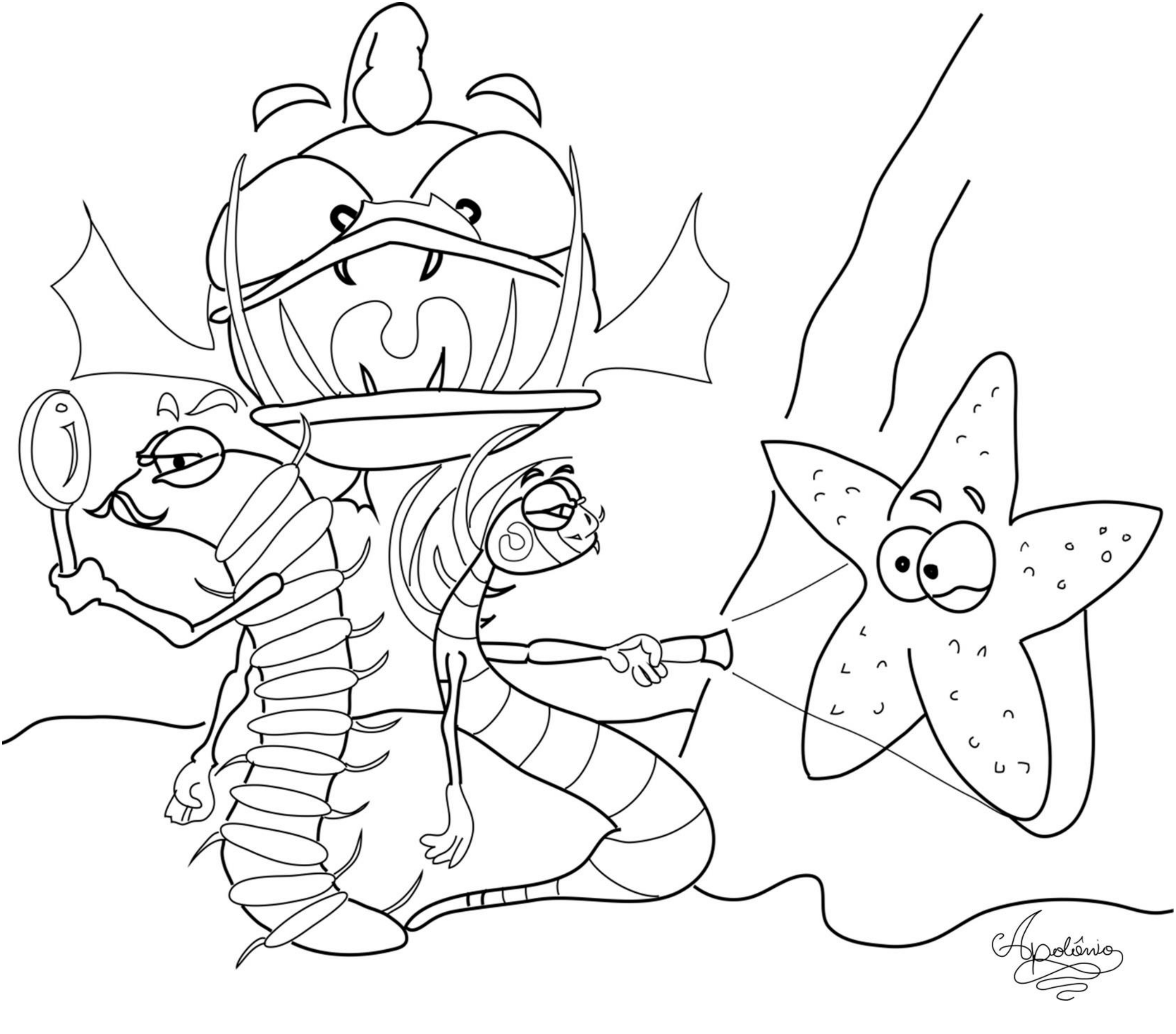


***D**eepsea- inzulu yolwandle*

Enzulwini yolwandle akukho nokuncinci ukukhanya, nto leyo ebangela abantu bacinge ukuba akukho bomi bunokufumaneka khona.

Ayisondelanga nakancinci kwinyaniso lo nto. Iindidi ngendidi zeentlanzi, oononkala abancinci kunye nezinye izilwanyana zenza ibubu enzonzobileni yolwandle. Kwaye iinemathodi ziyakuthanda khona. Ziyakwazi ukuphila ebumnyameni ngokuthi zisebenzise iamfidi endaweni yamehlo. Zisebenzisa ezi amfidi ukubhaqa ukutya, izihlobo kunye neentshaba.

Uyabona, zininzi izinto ezinomdla ezifumaneka enzulwini yolwandle.

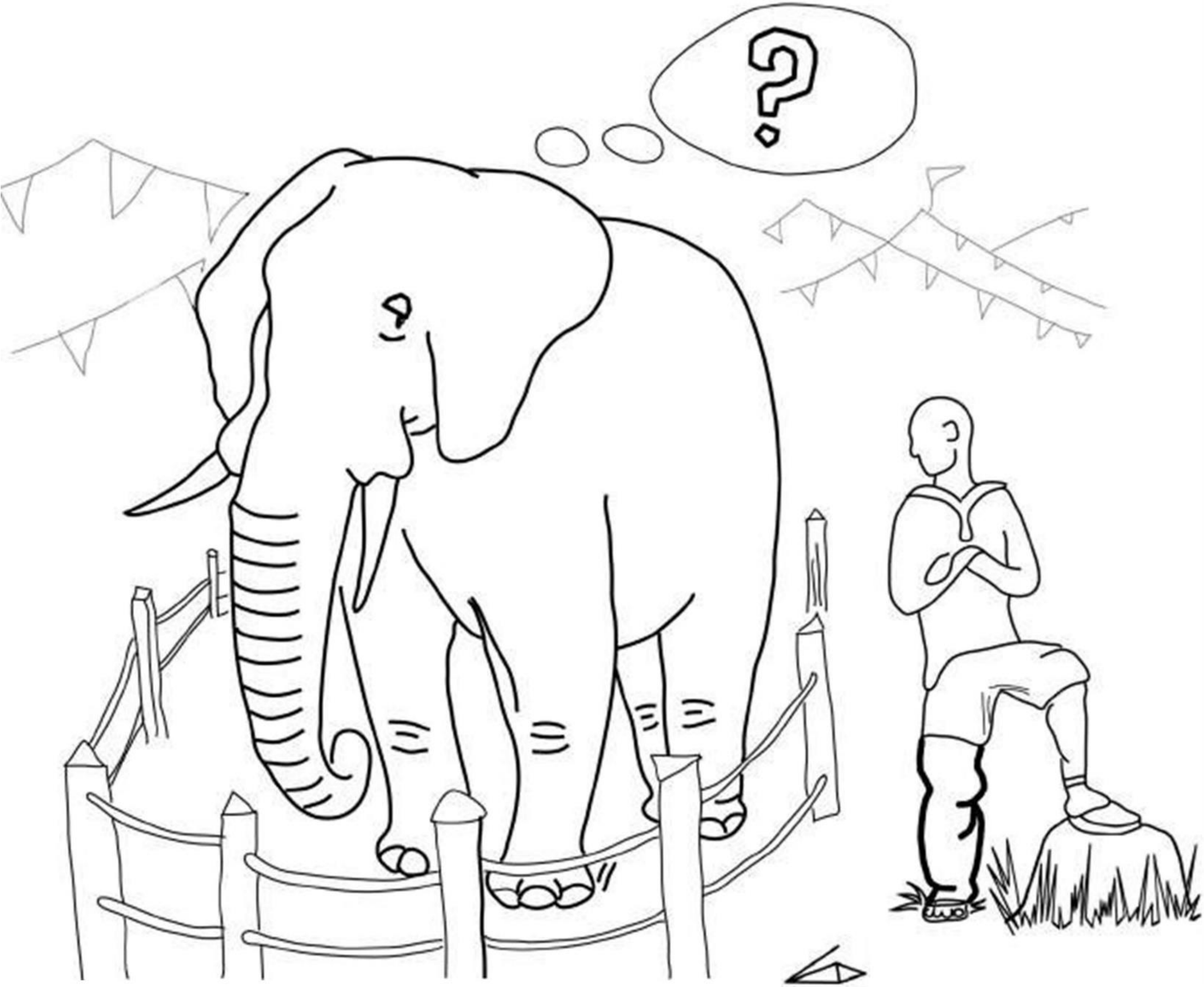

Apolônio

Elephant - Indlovu

Ubusazi na ukuba iintshulube ezingqukuva zingakwenza ukhangeleke njengeendlovu? Ingaba ziindaba ezimnandi ezo kubathandi bendlovu? Eneneni akunjalo!

Unobangela wesi sifo lulosuleleko lweentshulube ezincinci ezingqukuva. Ezi ntshulube ziphila kwimithambo yegazi ze ziyiphazamise, zibangele nokungahambi kwegazi. Oku kubangela ukudumba, itsho imilenze yethu ibukeke njengeeyendlovu.

Kuyothusa, anditsho?



Fossil - Iifosili

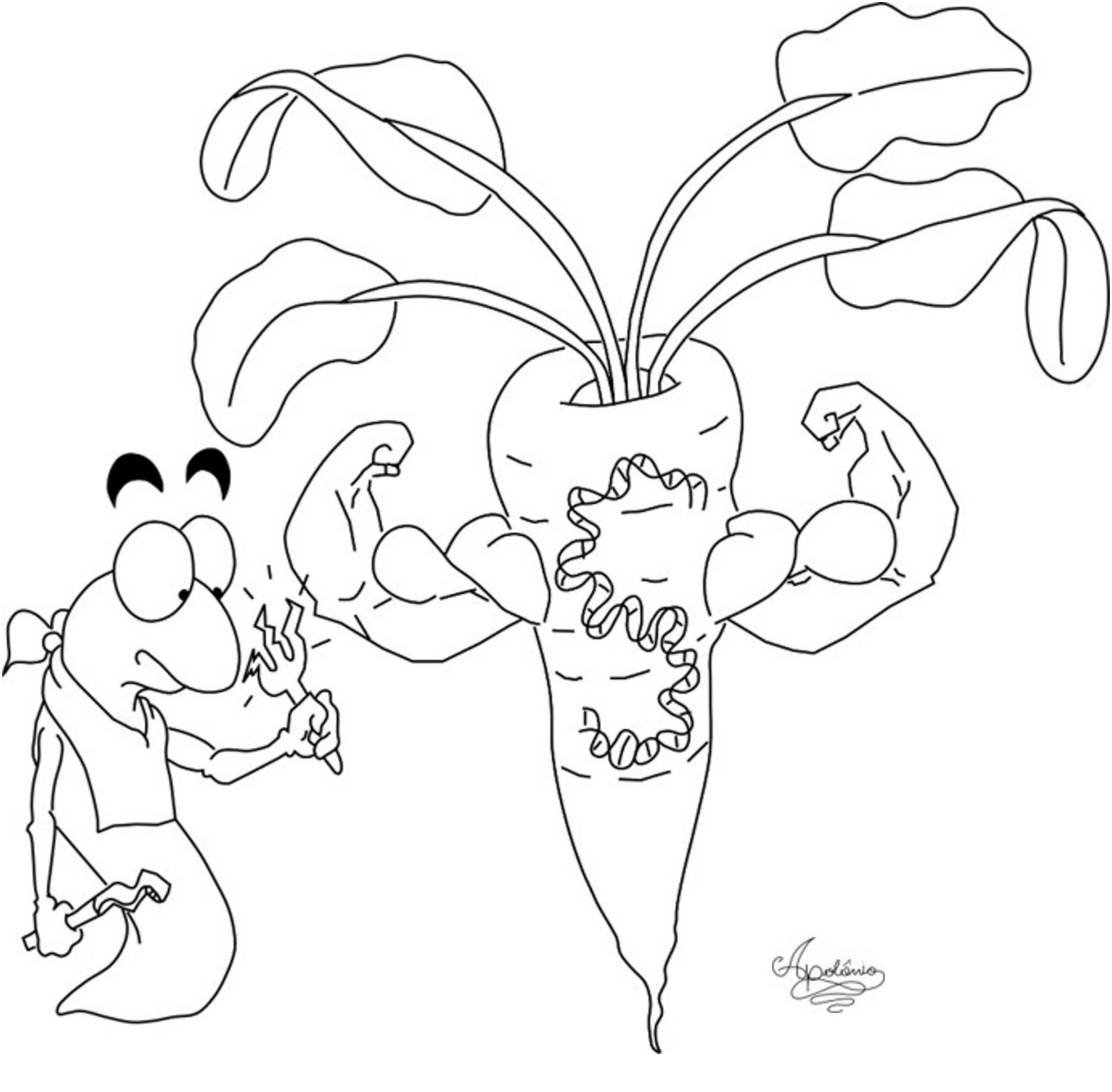
Iinemathodi zazikho kusahambahamba iidayinaso emhlabeni. Oku sikwazi ngenxa yokuba iinemathodi zafunyanwa kwiresini yemithi yepayina yamaxesha angaphambi kwembali. Iresini ke yaigcina ze yazilondoloza kakuhle ke ezi ntshulube. Iresini elondoloziweyo ke ikwaziwa njenge-emba.

Kwathi kwafunyanwa nezinambuzane ke kwi-emba. Iinzululwazi zafumana iinemathodi kwizinambuzane, zasixelela nokuba ngethuba leJurasikhi iinemathodi zazikade ziziziincukuthu zezinambuzane.

Asikayazi ke iminyanya yeenemathodi kodwa singanalo inqanaba lengqiniseko yokuba iinemathodi zokuqala zazihlala elwandle.

GMO-Ezbunjwe Ngokwemfuza

Izinto Eziphilayo Ezibunjwe ngokwemfuza zizilwanyana, izityalo okanye iintsholongwane ekuthi kuzo iInzululwazi zifakele ufuzo olongezelelekileyo, ngaphezu kwezimfuza esele zikhona kwiDNA yazo. Ngale ndlela isityalo sithi sikhuseleke ngcono kwizifo ezibangelwa zinematodes kwakunye nezinye iintsholongwane. Oku kwehlisa isidingo sokusebenzisa izibulali zinambuzane kwezolimo. Oku kuyilungele impilo yethu nokusingqongileyo!

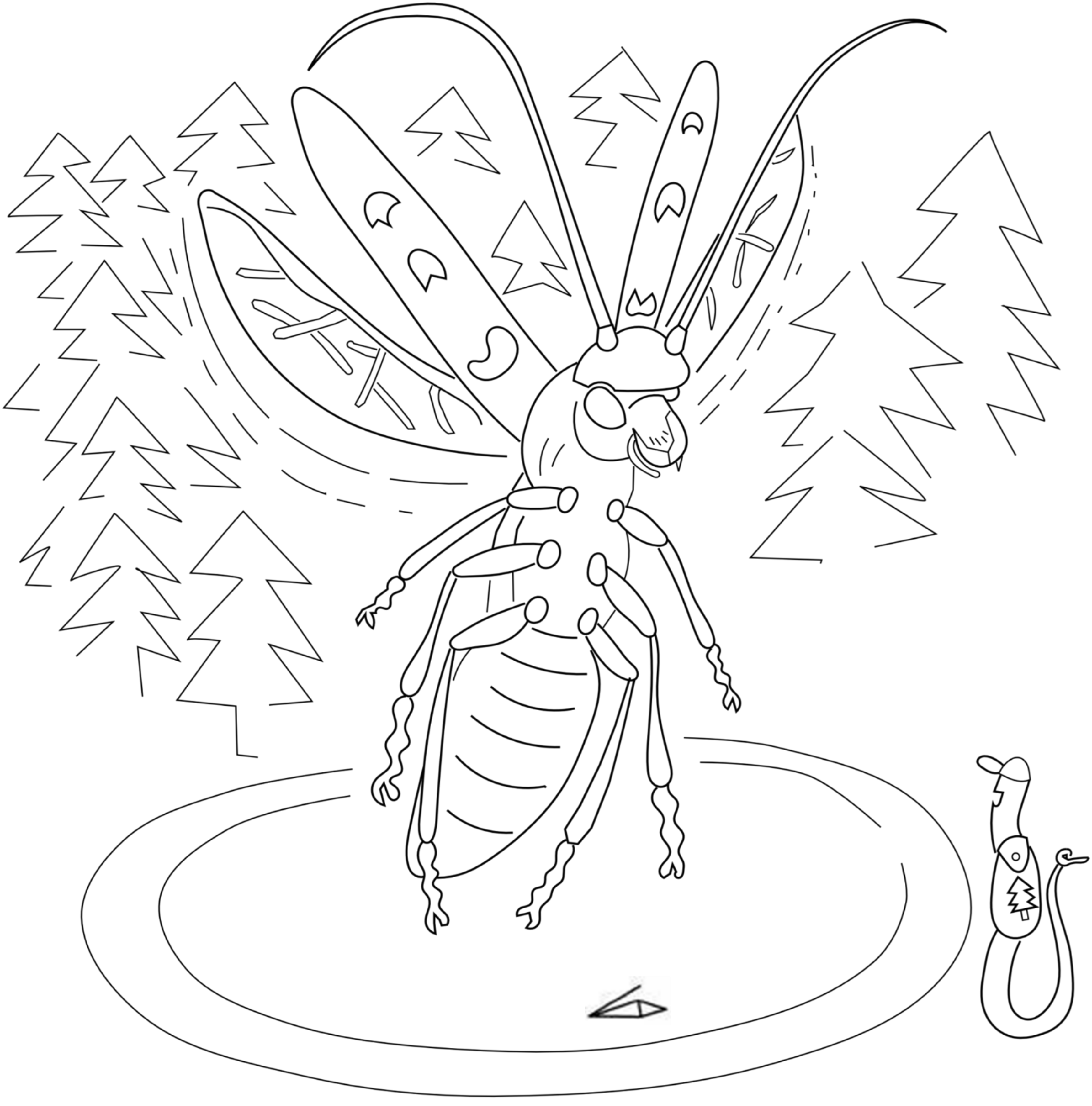

Apolônio

Hitchhike - ukukhwela

Ezinye intshulubе zihlakaniphile.

Iinemathodi ezifumaneka kumthi wepayina zikhwela kooqongqothwane ukuze zibhabhe ukusuka komnye umthi ukuya komnye. Ooqongqothwane bavula imingxuma emincinci kwimithi ukuzondla nokuzalela amaqanda azo. Iinemathodi zisebenzisa le mingxuma ukufikelela kwimijelo yamanzi neyokutya esemithini. Kulapho zifumana khona indawo elungileyo yokuziphindaphinda kodwa emva kwexesha ziyayivala le mijelo, nto leyo ibangela umthi ungabi nampilo ude ufe. Uqongqothwane ngoko uncedisa iinemathodi nezifo/iintsholongwane zisasazeke.

Ngelishwa, oku kukhwela yingozi enkulu kule mithi yepayina kwilizwe jikelele.

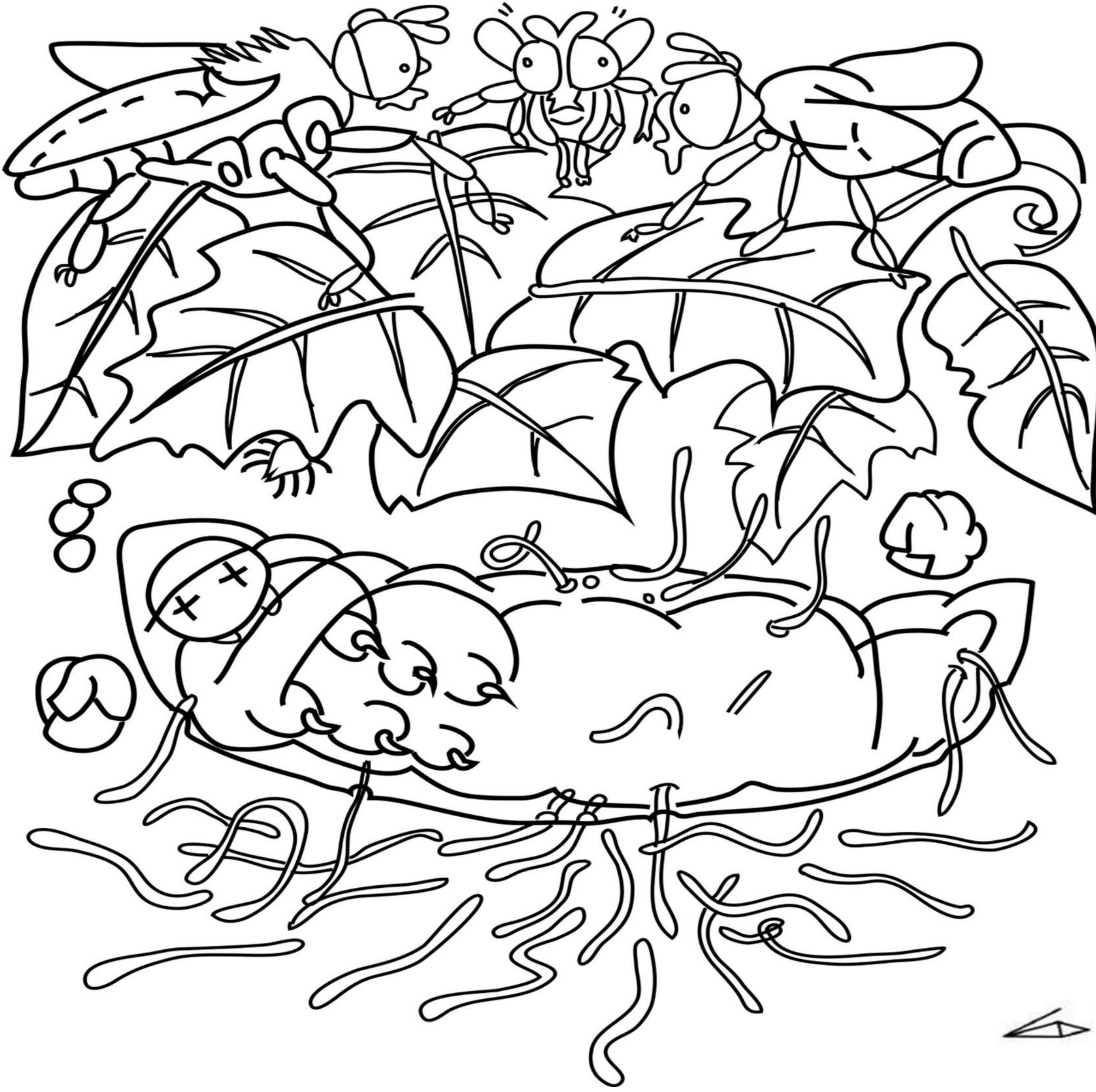


Insect - Isinambuza

Ngamanye amaxesha, izinambuzane ziyacaphukisa. Zivula imingxuma kwiziqhamo zize zonakalise nemithi.

Ngethamsanqa ke, kukho iinemathodi ezisincedayo ekulweni ezi zinambuzane. Xa iinemathodi zisencinane, zingena kumbungu wesinambuzane. Intsholongwane ethwalwa zezi ntshulube zincinci iyaphindaphindana kule mibungu, zinike ukutya kwezi nemathodi. Iinemathodi nazo ziye zikhule, ziphindaphindane zide zibe ngamawaka pha embungwini, zibangele umbungu ukuba ufe.

Ngolu hlobo singakwazi ukukhusela izityalo zethu ngeentshulube eziphilayo ngaphandle kokuba sisebenzise iimveliso zamayeza. Oku sikubiza ulawulo lwenkqubo yendalo.



Jungle - Ihlathi elishinyeneyo

Izifunxigazi lezilwanyana zinomjikelo wobomi ontsokothileyo nonobukrelekrele. Zide zisebenzise ezinye izilwanyana ukuya kutsho kwezinye apho ziyokuqgibezela khona obu bomi bazo buntsokothileyo.

Umzekelo omangalisayo ngulowo we Myrmeconema *neotropicum,* ehlala kumahlathi ashinyeneyo asemazantsi aseMelika kwaye zithanda ukuhlala kwilindle leentaka. Eli lindle lentaka lithi lityiwe zimbovane, ngaloo ndlela iinemathodi ziphelela zikwisisu sembovane. Iinemathodi ziye zikhule kwisisu sembovane. Isisu sentaka siqalise ukudumba size sitshintshe nombala: umbala utshintsha ekubeni mnyama ube bomvu nto leyo yenza imbovane ikhangeleke okwequnube.

Intaka ziyawathanda amaqunube, ngoko ezi nemathodi ziba nomtsalane kwiintaka. Iintaka zitya iimbovane zize zisasaze iinemathodi kwakhona kwilindle lazo, ngale ndlela umjikelo wobomi ugqityiwe.

Z Z Z Z

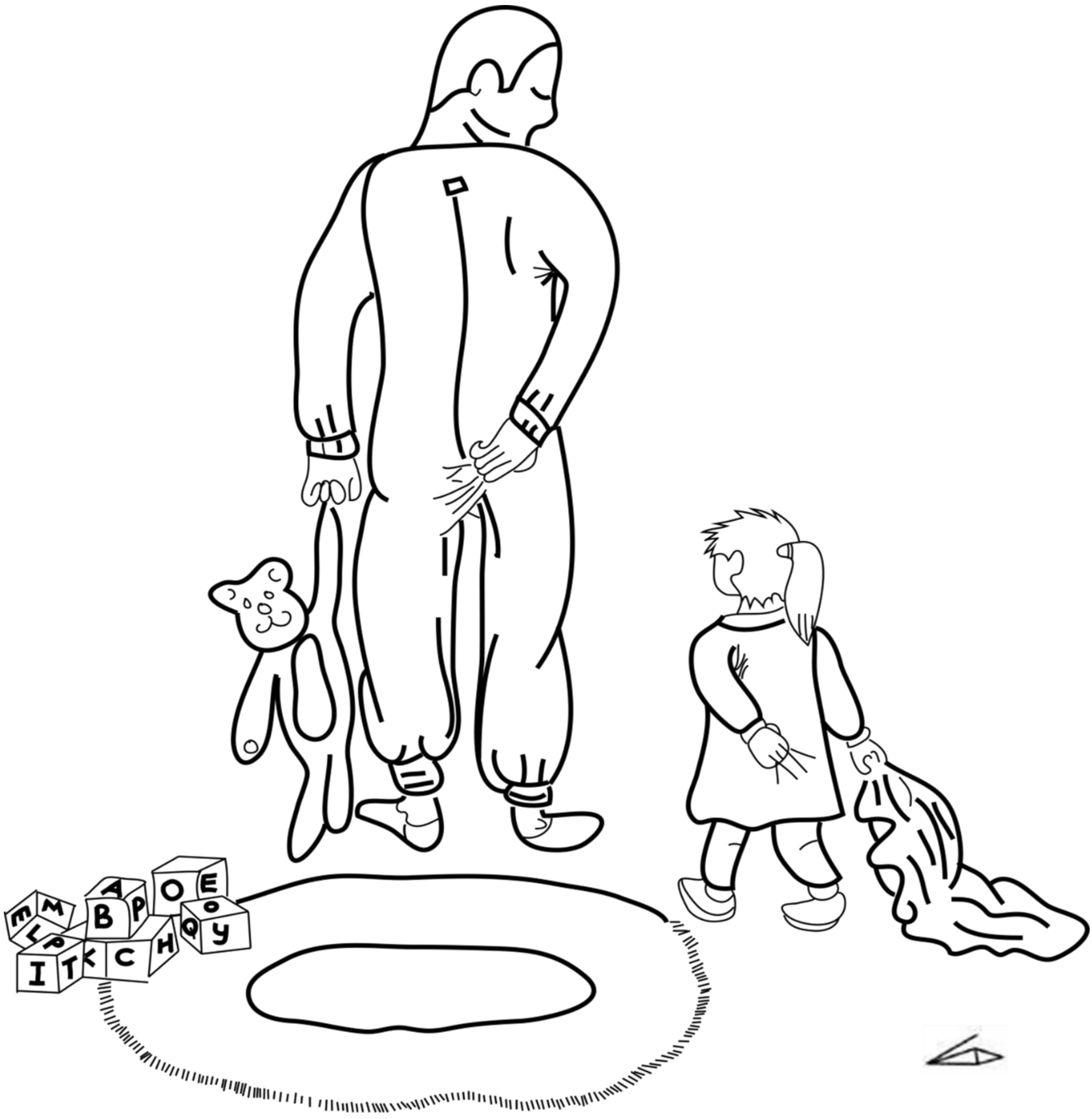
Kid - Umntwana

Ingaba ziyarhawuzela iimpundu zakho? Mhlawumbi uneentshulube?

Ulosuleleko lweentshulube luxhaphakile ebantwaneni. Imazi yolu hlobo lwentshulube iphila kumathumbu abantu. Ebusuku zizalela amaqanda kufutshane nomva weempundu apho ioksijini idingeka khona ukuze amaqanda eziintshulube aqandusele khona.

Ukunyakazela kweentshulube kubangela ukutshotshozela kweempundu. Xa uzirhawuzela, amaqanda ayasasazeka ukususela eminweni kuye kuma kwizinto zokudlala. Xa umntwana efaka into yokudlala emlonyeni uye aginye amaqanda, osuleleke.

Ngoko ke, bantwana hlambani izandla!!!



Love - Uthando

Uhlobo ngalunye lweenemathodi lunendlela yalo olwenza ngayo ezesondo. Uninzi lwazo lwenza ngohlobo olufanayo nolwabantu: kukho amadoda nabafazi abazalayo.

Kwezinye iintlobo ufumana italasi kuphela. Ezi zezo zinezitho zobukhomo nesini sobukhomokazi ngaxeshanye kwaye ziyakwazi ukuzizalisa ngokunokwazo.

Ngamanye amaxesha akubikho zimazi konkekonke. Siye sifumane iitalasi kuphela (ezo zizichumisa kwangokwazo) ze ekuhambeni kwexesha kungene inkunzi (echumisa imazi). Zithi ke iinkunzi zidibane neetalasi ezi emva komxhentso.

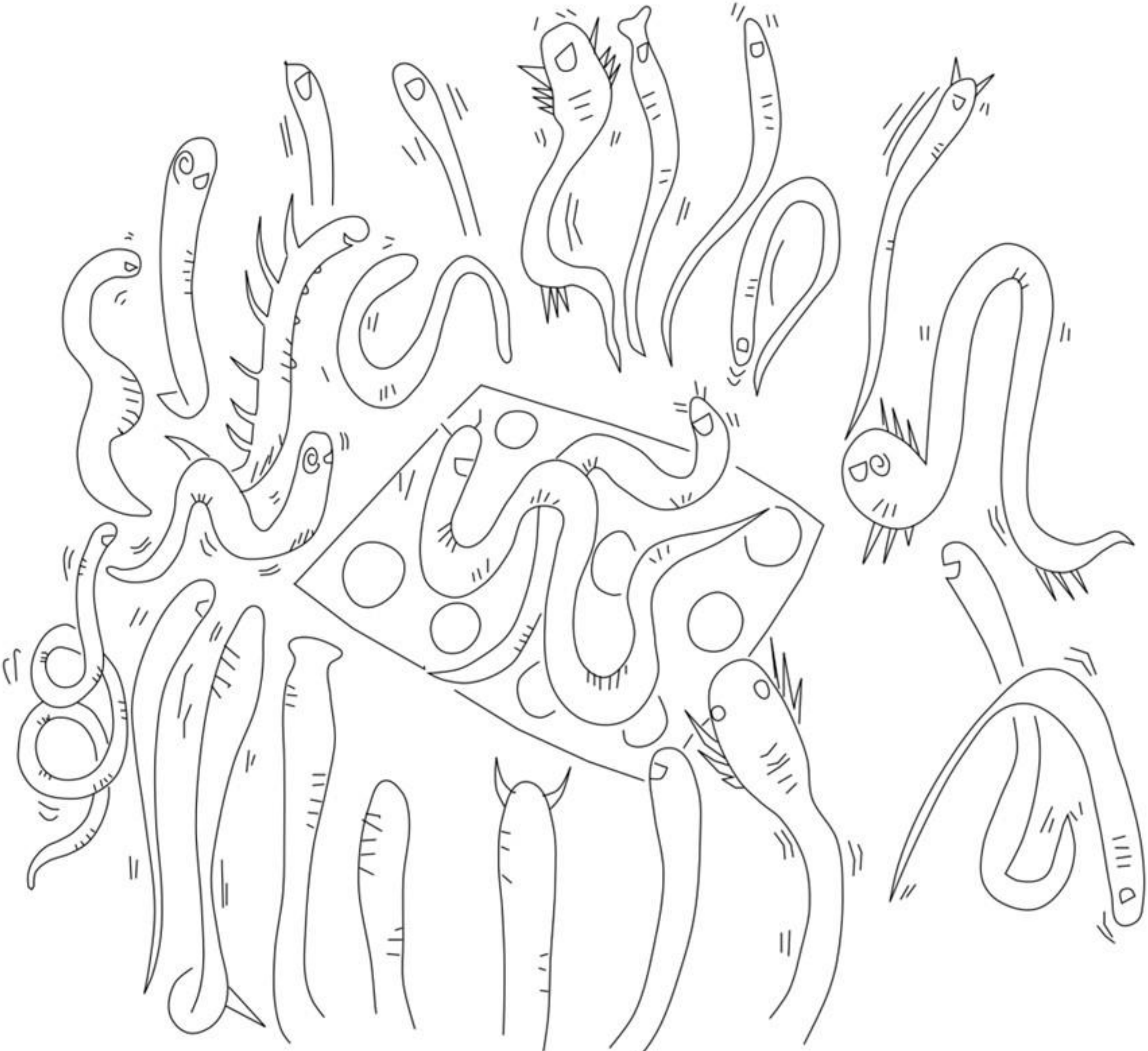
BB '13

Movement - Intshukumo

Iintshulube ezingqukuva ziyakhawuleza kakhulu. Uninzi lwazo lushukuma njengeenyoka zinyubeleza zisebenzisa izihlunu zazo ezisuka entloko kuye kuma emsileni.

Ezinye zinobuvila, kodwa ezinye zikhawuleza kakhulu, ngolu hlobo ubani angaziqaphela ngohlobo ezihamba ngalo.

Ezimbalwa ezingqindilili ezimfutshane ezinezihlomelo ezinde, njengamalungu, ziyohluka, zisebenzisa ezi zihlomelo zishukume njengombungu.



Nobel prize - Ibhaso le Nobel

Intshulube engqukuva i*Caenorhabditis elegans* idumile phakathi kweenzululwazi. Zisetyenziswa ukufuma iimpendulo kwimibuzo emininzi emalunga nenzululwazi yobomi.

Umzekelo, iqanda liphuhla njani libe yintshulube? Iintshulube ziliva njani ivumba lokutya okanye zinyakaza njani?

Kwiminyaka yakutsha nje zininzi izinto ezibalulekileyo ezifunyanisiweyo kwaye neendlela ezintsha ziphuhliswe kusetyenziwa le ntshulube incinci. Ezi zinto zifunyanisiweyo zibaluleke kangangokuba phakathi kuka2002 no2013, iinzululwazi ezintandathu ezisebenze nge*Caenorhabditis elegans* zathi zawongwa ngeembasa ezintathu zeNobel.

NOBEL
PRIZE

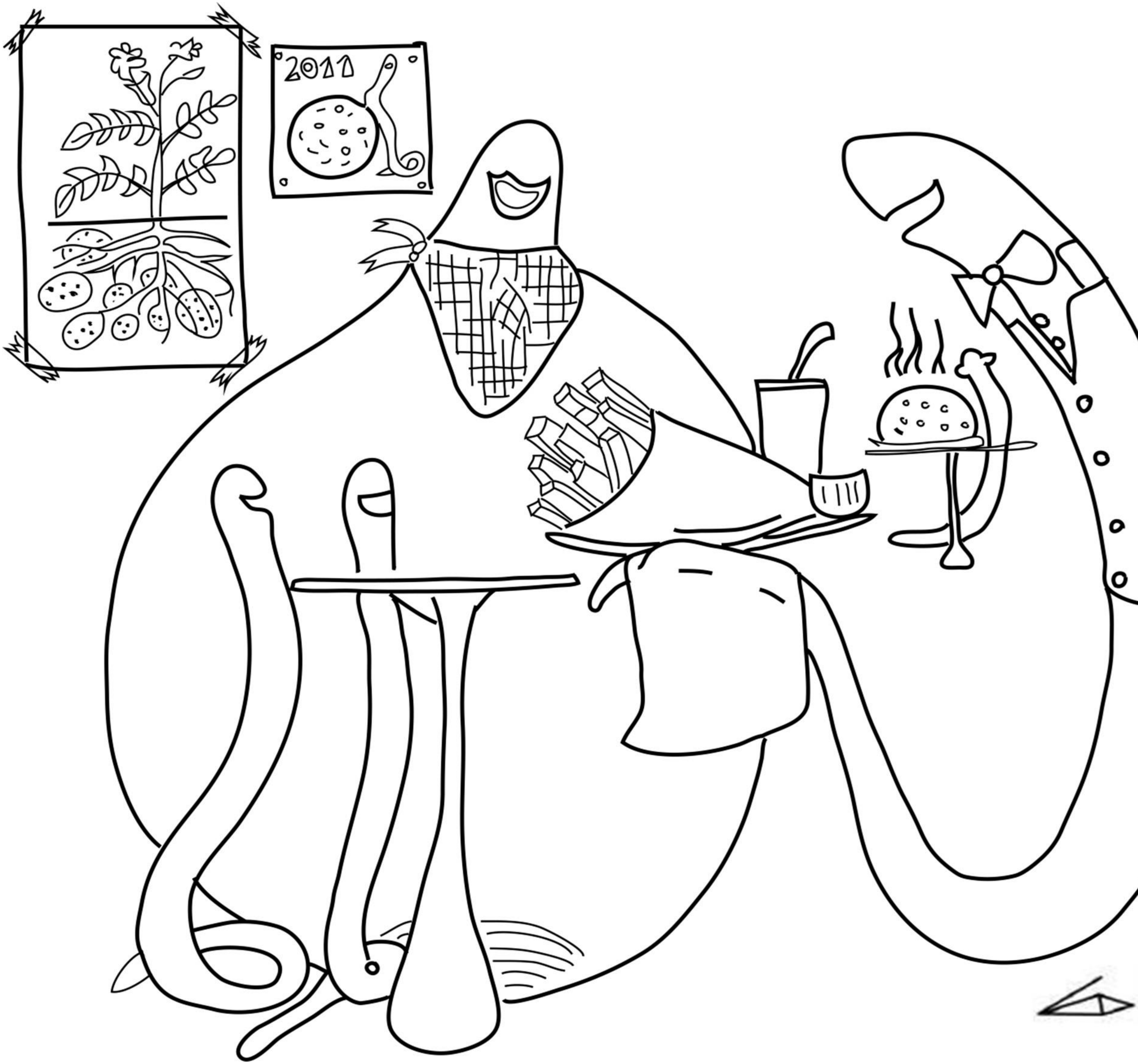
Ocean - Ulwandle

Ulwandle lubaluleke kakhulu ebantwini. Ngelishwa, asenzi okwaneleyo ukulikhathalela. Ioli, iitoni zenkukuma kunye nemveliso ezinetyhefu zilahlwa elwandle. Ngokwemvelo, oku kunempembelelo ebalulekileyo kwizilwanyana eziphila khona. Xa kukho intlekele yeoli ubumdaka obunobungozi buphumela enyeleni zize zife phantse zonke izilwanyana ngaphandle kweenemathodi. Iinemathodi ukuzothi ga ngoku zezona zilwanyana zininzi ngaphantsi kolwandle, kwaye ziziintlobontlobo ezahlukeneyo. Ezinye zibuthathaka kakhulu kungcoliseko olufana nokuchitheka kweoli ukanti ezinye ziyakwazi ukumelana noku. Iinzululwazi zifumanise ukuba ezinye iinemathodi zinakho ukunceda ekucoleni ukungcola okuyingozi kweoli. Ngale ndlela uphando olumalunga neenemathodi lusixelela okuninzi ngeziphumo zongcoliseko lolwandle kwaye zikwasibonisa ukuba iinemathodi zinganceda ukuphelisa olu ngcoliseko ukuze lusinde ulwandle.

Potato - Amazambane

Amazambane agcadiweyo, abhahakiweyo kunye nacunyuziweyo, siyawathanda sonke. Ubusazi ke ukuba iinemathodi nazo ziyawathanda amazambane?

Iinemathodi zeengcambu zamazambane kunye nezo ezibangangela amaqhuma kwiingcambu zingafumaneka kwiingcambu zezityalo zamazambane. Iinemathodi zibangela amaqhuma neentsumpa kumazambane, zize zingabukeki, ngoko umlimi angakwazi ukuzithumela ezivenkileni ukuze zithengiswe.


2011

Quarantine - uvalelo

Ezinye iintlobo zeenemathodi zibangela ukugula kwizityalo, nto leyo ikhokelela kwisivuno semifuno esibi seziqhamo okanye sengqolowa.

Xa uhlobo oluthile lweenemathodi oluyingozi lungafumaneki kwilizwe elithile, elo lizwe lenza konke elinakho ukuzama ukuthintela ukuba loo nemathodi ingene kwelo lizwe. Loo nemathodi iphela ikuluhlu lohlobo olunxwenyiweyo okanye oluvalelekileyo. Amagosa ongeniso lwezinto elizweni asebenzisa olu luhlu xa imveliso zolimo nezamahlathi zingena okanye ziphuma. Iimveliso eziqulethe ezi nemathodi ziyajikiswa kungenjalo zitshatyalaliswe.

1.
2.
3.
4.
5.
6.

Retriever - mphuthumi

Kuhlobo lwenja enguMphuthumi, okanye nakweyiphi na inja, zininzi iinemathodi ezithi zifumaneke: iintshulube zentliziyo, iintshulube zemiphunga, imisundululu kunye nezinye. Ezi ntshulube zisasazeka kunye nobisi lukamama okanye ngokusingqongileyo. Ziphila emathunjini, kwimiphunga okanye ezintliziyweni.

Amaxesha amaninzi ubani akangeqondi ukuba inja inezi nemathodi, kodwa maxa wambi ukugula ngamandla kunokwenzeka, ukugula okunje ngokopha, zibe neengxaki zokuphefumla okanye zibhitye kakhulu.

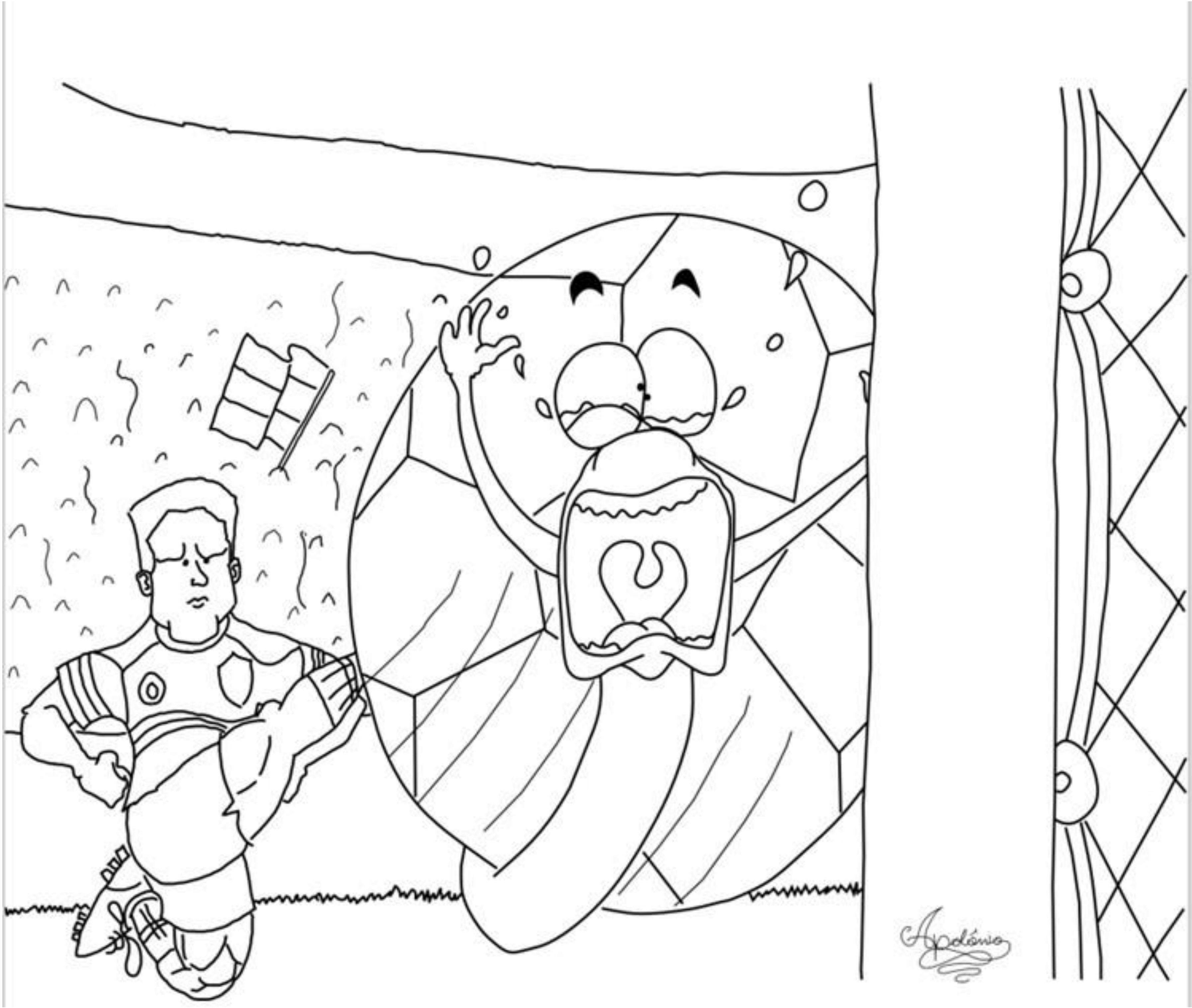
Eyona nto ingcono ubani angayenza kukuqinisekisa ukuba inja yakhe uyikhusela rhoqo kwiintshulube ngokuthi asebenzise amayeza acetyiswe ngoogqirha bezilwanyana. Ngolo hlobo zonke ezi nemathodi ziyafa, izinja ziphile qete zihlale zisempilweni.

HOND

Soccer – ibhola ekhatywayo

Amabala ebhola ekhatywayo anonotshelwa ngobunono. Ayankcenkceshelwa yonke imihla, amanye anokufudumala kwaphantsi komhlaba. Iinemathodi ezihlasela izityalo ziyakuthanda oku! Kwimilomo yazo zinomkhonto omile okwenaliti, eziwusebenzisela ukufunxa incindi yeengcambu zengca. Amaxesha amaninzi kubakho izigidi zezi nemathodi kumabala ebhola.

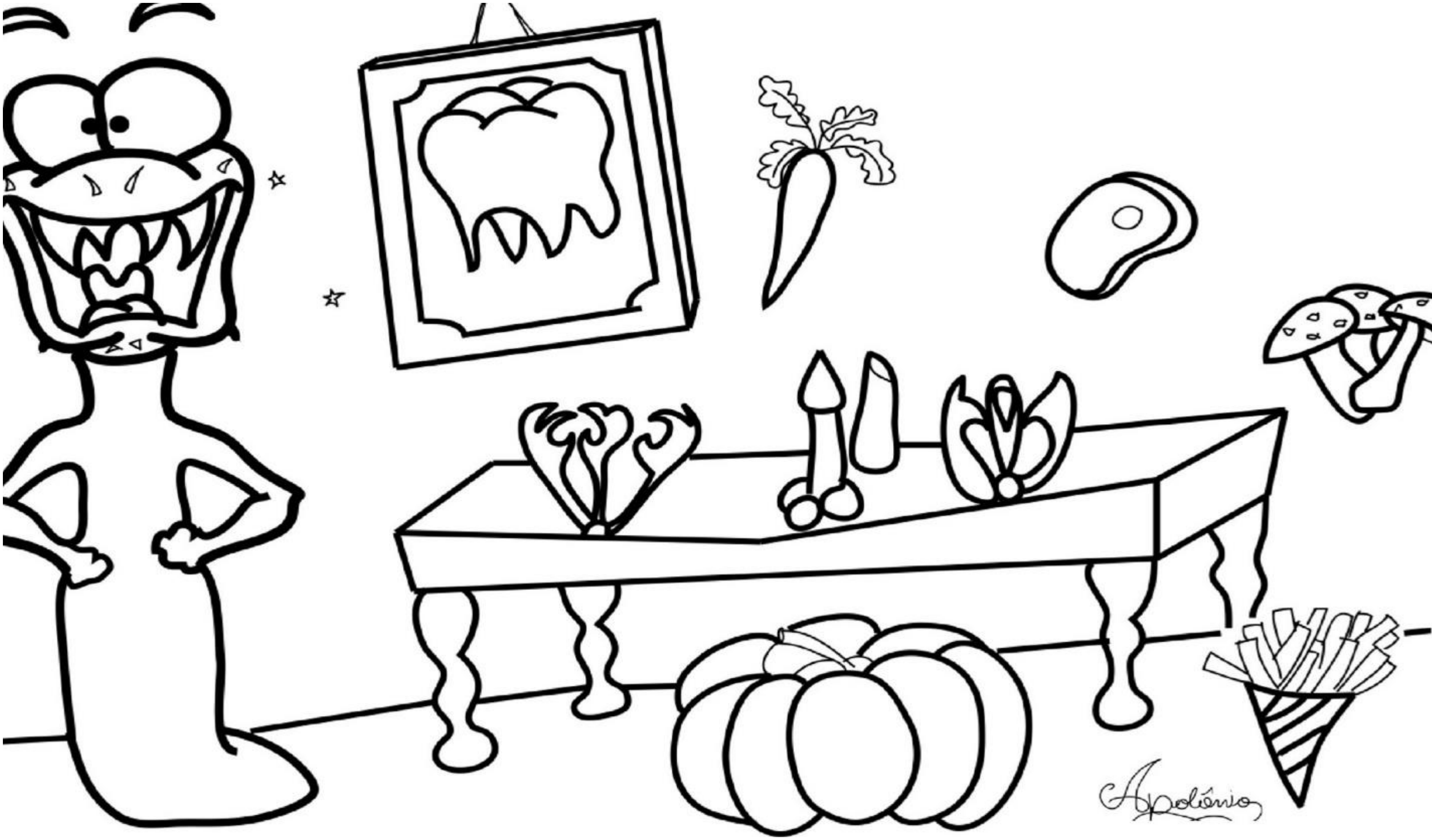
Ngokwesiqhelo umonakalo kwingca awubi mkhulu, kodwa ukuba zininzi kakhulu iinemathodi, kuye kuvele amabala antsundu kwingca njengoko isifa, kuze ekugqibeleni litshabalale ibala lebhola ekhatywayo. Iinemathodi ziyacaphukisa kubadlali bebhola, kodwa zona azihlutshwa ngabadlali bebhola.



Teeth -amazinyo

Njengabantwana abancinci, iintshulube ezincinci ziyakhumka. Kodwa ke kwiinemathodi yenzeka kube kane ngaphambi kokuba zibe namazinyo obudala. Phakathi kweentlobo, la mazinyo angakhangeleka ohlukile, kuxhomekeke ekubeni zitya ntoni.

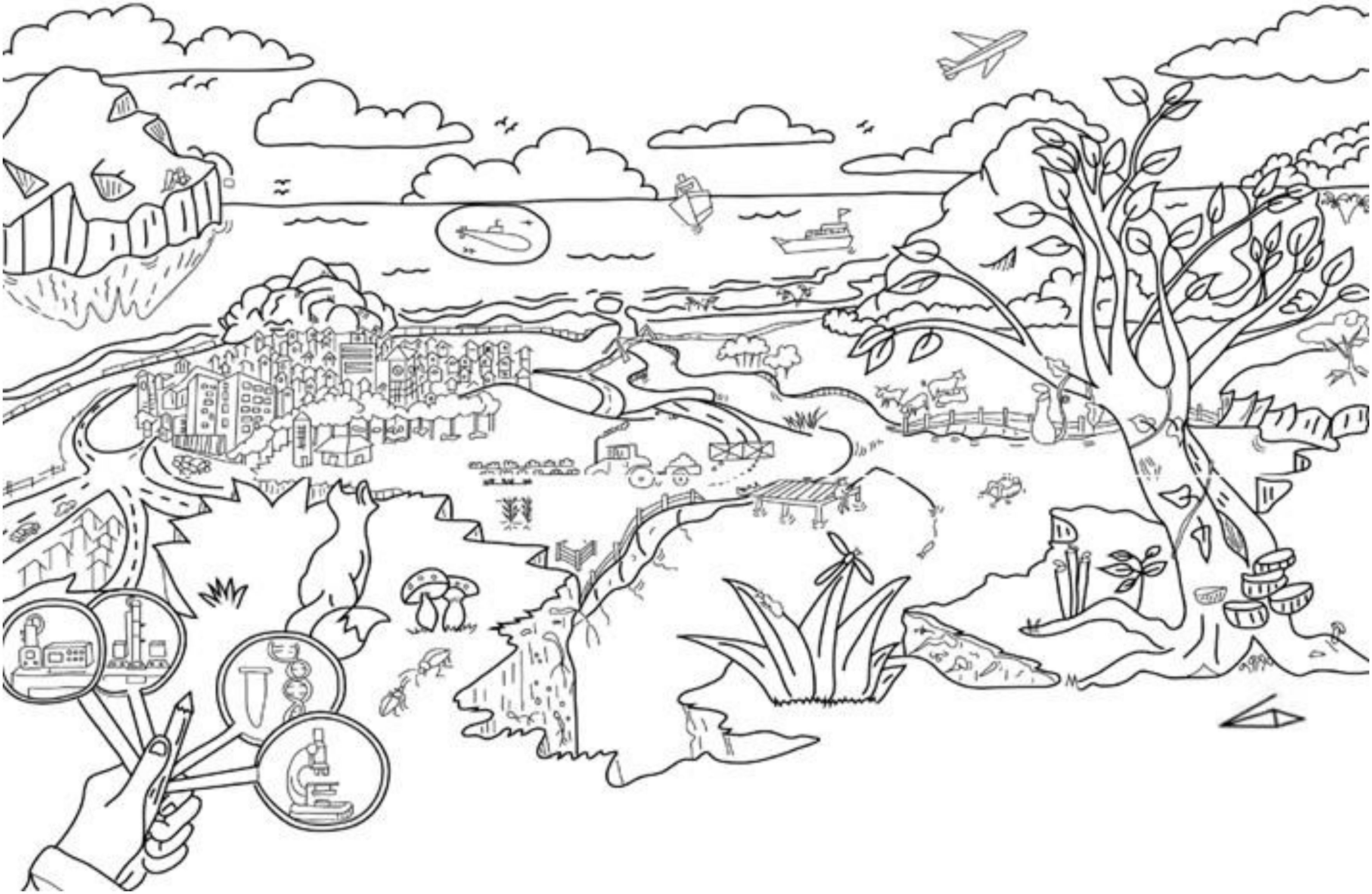
Ezinye iintshulube, ezenza ezinye amaxhoba azo, zinamazinyo abukhali ezitya ngawo ezinye izilwanyana. Ezinye iinemathodi zinezinyo nje elinye, elikhangeleka njengomququ ukuze zifunxe ingcambu zomthi. Zikhona nezingenawo amazinyo. Zona zitya iintsholongwane ezincinci… mmm imnandi.


Apolônio

Unique -Ekhethekileyo

Xa ufunda lo mbhalo yiba nomfanekisongqondweni wendawana yendalo entle.

Le ingaba yiyo nantoni na ke: ulwandle olunesanti emhlophe kunye nolwandle ololuhlaza olucwebezelayo, umlambo ojikelezayo okanye ihlathi elikhulu. Usengacinga ngezilwanyana kunye nezityalo. Akunamsebenzi nokuba leliphi na iqhekeza lendalo ocinga ngalo, zonke ezi ndawo zinento enye efanayo: zikho iinemathodi kuloo ndawo. Jonga kulo mzobo, yonke into ekulo mzobo ikokungqonge uhlobo oluthile lweenemathodi. Ikhethekile, andithi!?

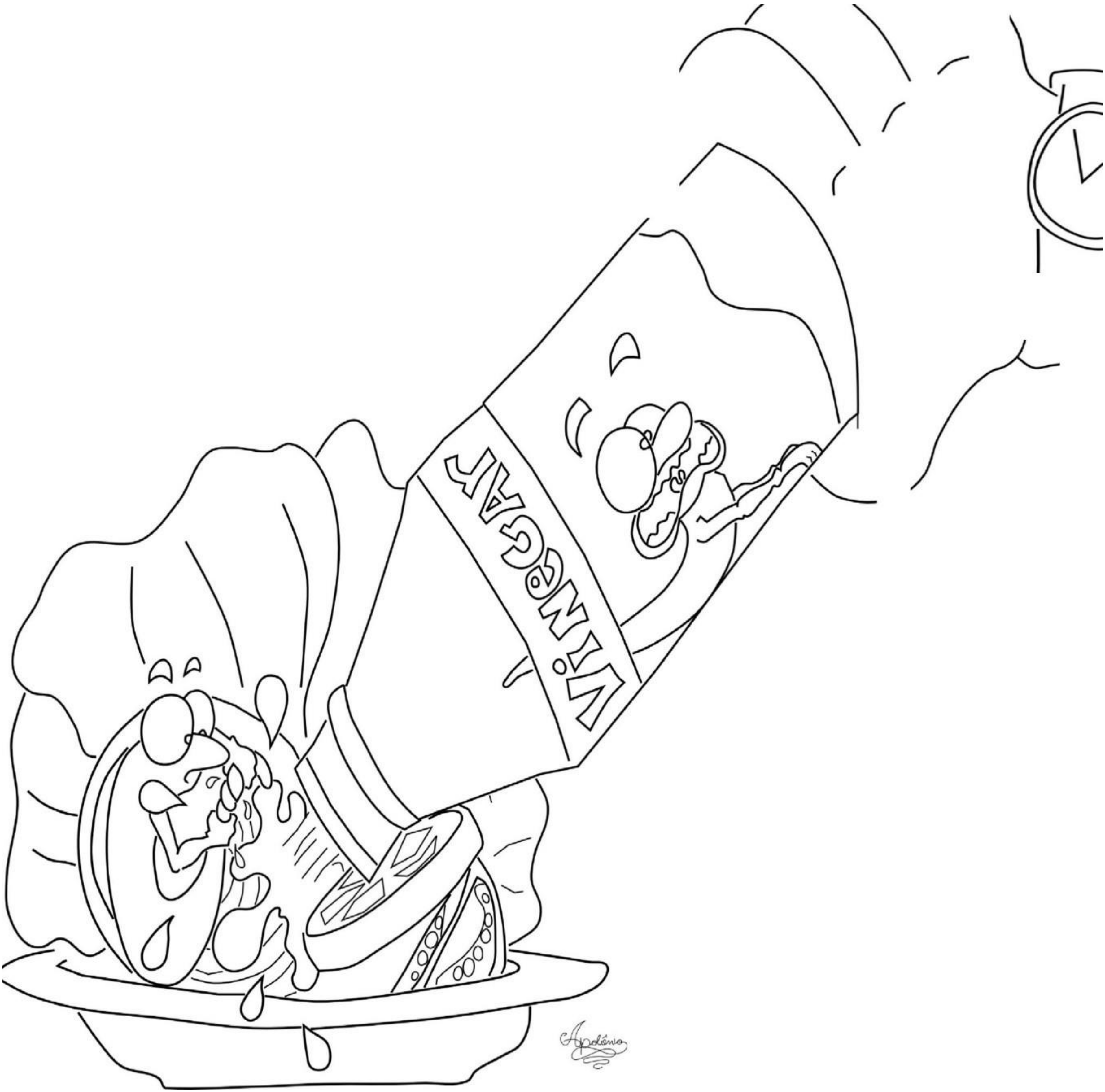


Vinegar nematode – Ivinigar

Iinemathodi zeviniga (*Turbatrix aceti*) zineematodes eziphila ngokukhululekileyo neziphila kwindawo ezineasidi. Zimalunga ne1-2 yeemilimitha yaye zitya iintsholongwane ezisuka ema-apileni nakuhlobo oluthile lwentsholongwane ebizwa ngokuba ngumama we viniga ekwiviniga engacocwanga.

Umbungu weviniga ufanelekileyo njengokutya okuphilayo okwenzelwe iintlanzi ezincinci kwaye kulula nokuzikhulisa.

Uyayithanda imiboniselo kwaye ungakonwabela ukuzama ukukhulisa imibungu yeviniga? Kulula kakhulu: udinga nje ibhotile yeglasi okanye eyeplastiki, iviniga yeapile okaye eyesiqhelo efakwe iqhekeza leapile, amanzi, ithishu yokugquma, iphepha lokuhluza ikofu kwakunye nemibungu yeviniga. Khangela iresiphi kwi-intanethi…. okuhle kodwa!


ViNeGAr

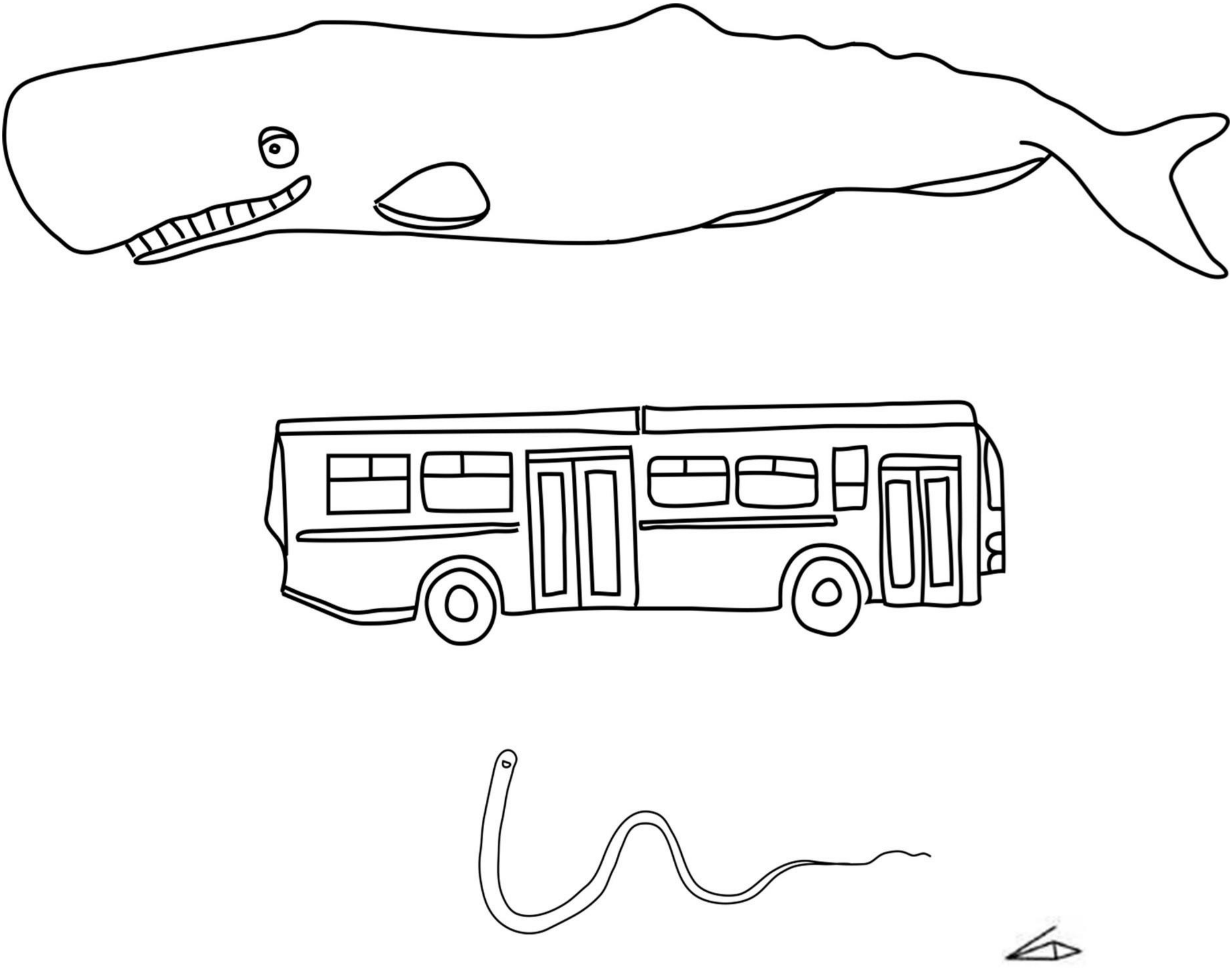
Whale – Umnenga

Unalo ulwazi ngencwadi emalunga noMoby Dick, umnenga omhlophe?

Kule ncwadi umbhali uchaza uMoby Dick njengomnenga omkhulu ngohlobo olungaqhelekanga, ondlongondlongo nonobungozi, ongunobangela weentlekele zaselwandle.

Ngokwemvelo, libali kuphela, kodwa lo mnenga eneneni sesinye sezilwanyana ezikhulu ehlabathini, mkhulu kunooduladula ababini. Eyona ntshulube ingqukuva enkulu kunazo zonke yafunyanwa kule minenga: iphantse yande kangangeemitha ezi8 kunye ne 2.5 yeesentimitha ububanzi.

Kwisisu somnenga oyimazi, intshontsho kunye neentshulube zitya umgcantsi. Ukuba uyayazi ukuba umnenga mkhulu kwaye ukhulelwe iinyanga ezili15, uya kuqonda kungani na ukuba ezi ntshulube zibe nkulu kangaka.

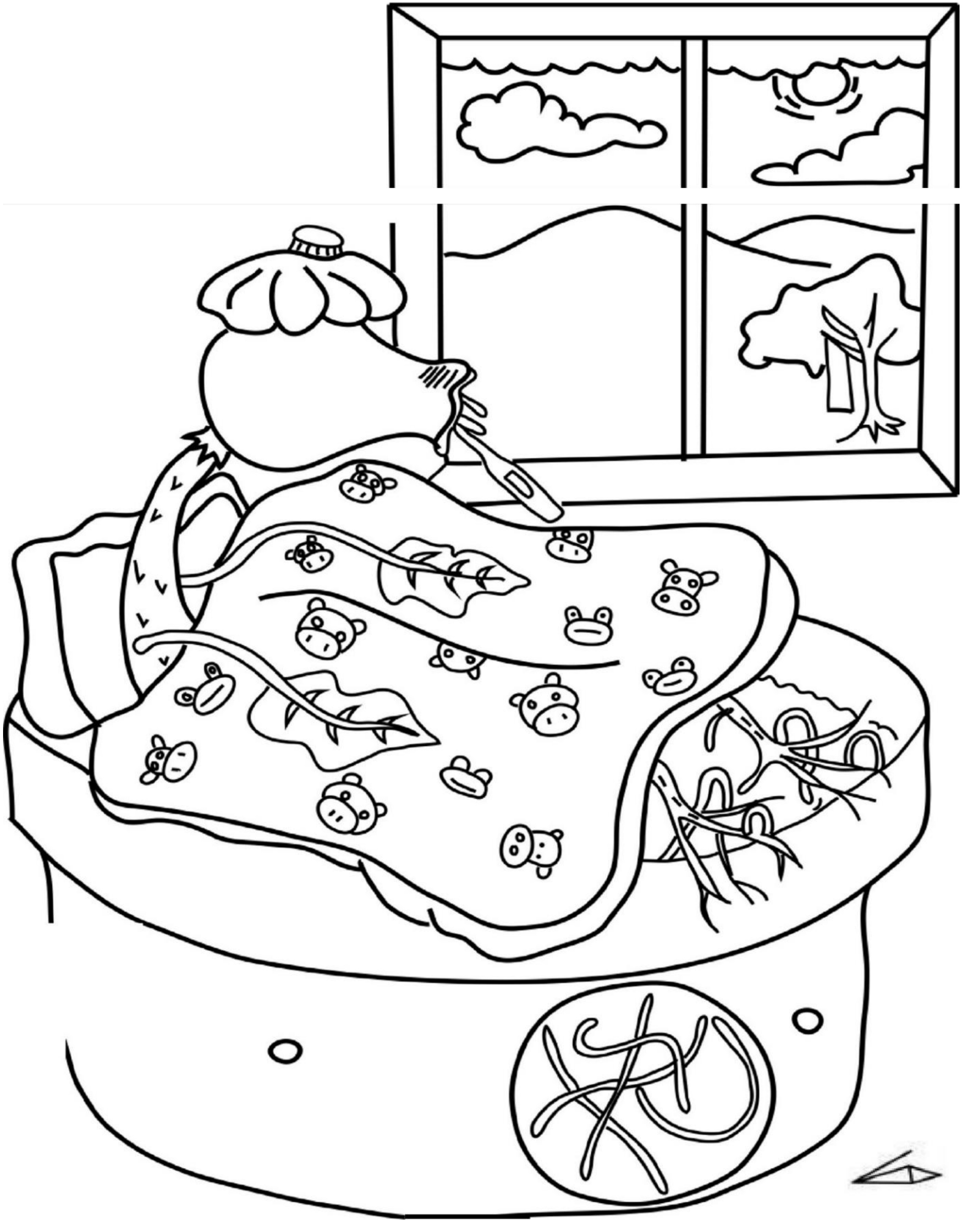


***X**iphinema - IXiphinema*

IXiphinema ligama elinzima eli!

Ubusazi na ukuba iintshulube ezingqukuva nazo zinamagama?

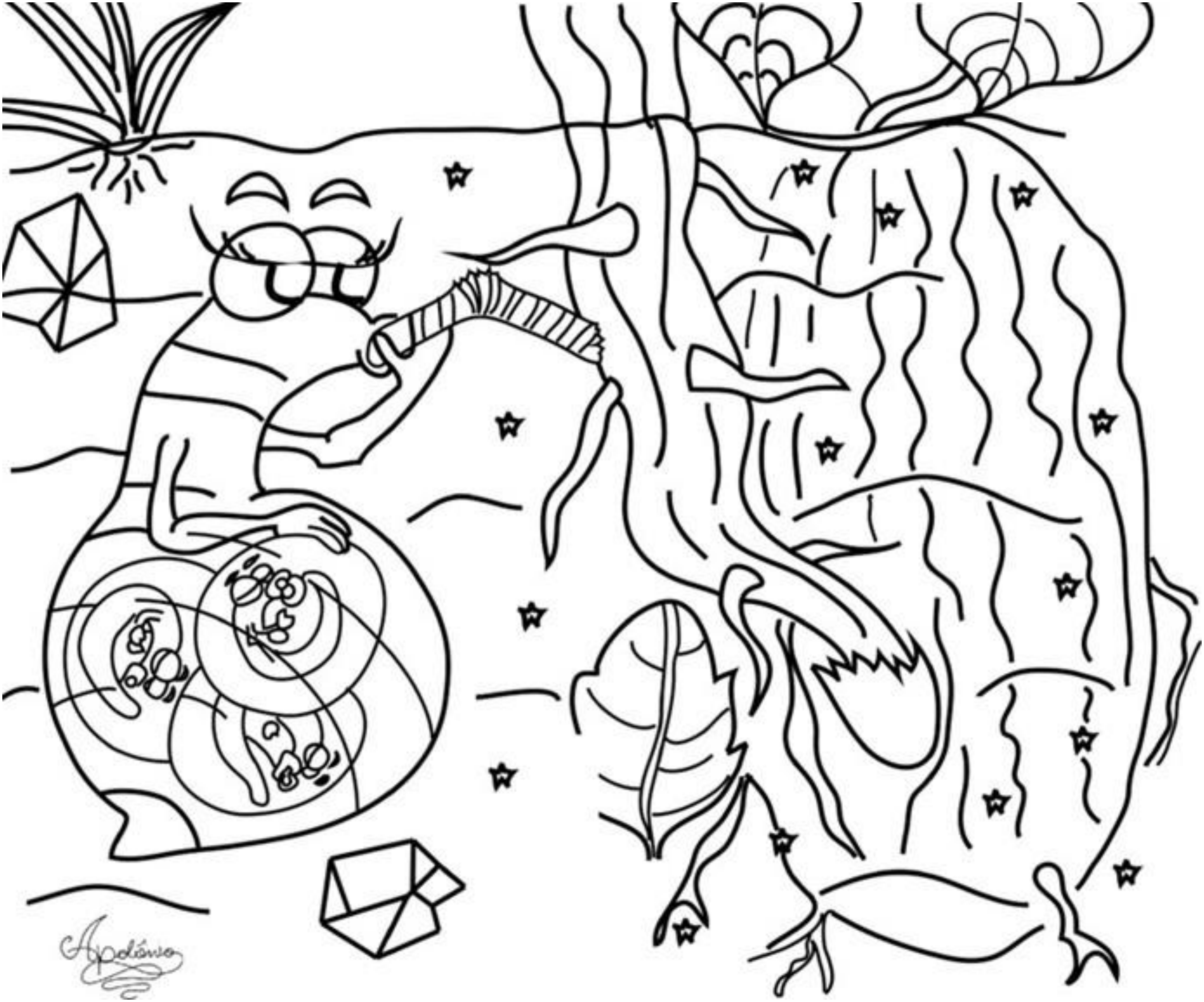
KwisiGrike samamndulo, igama *Xiphi* limele ukuthi “imile njengekrele”. ii*Xiphinema* zizitshabalalisi zezityalo kwaye zinamazinyo afana nekrele. Lolu phawu lwenza ukuba izazinzulu zikhethe eli gama. Ngeli zinyo zigqobhoza kwizityalo ukuze zitye. Ezinye iintlobo ze*Xiphinema* zithwala iintsholongwane kwaye ezi ntsholongwane zingasasazeka kwisityalo size sigule. Ngethamsanqa, izazinzulu kunye nabalimi bazifumana iindlela zokukhusela izityalo ekuguleni.



Yam - iyam

Kubantu abaninzi abakwiindawo ezishushu, iyam ngumthombo wokona kutya kusisiseko. Ikhangelela okwezambane. Iinemathodi ziyathanda ukutya iyam. Ziyithanda kakhulu kangangokuba zingayitshabalalisa yonke ingcambu, zingamshiyeli nto umfama kunye nosapho lwakhe.

Ezinye iinemathodi zingena ngaphakathi kwiingcambu, ziyifunxe ingcambu de zityebe ngokwenene, zizale amaqanda. Izityalo ziyakuva ukubakho kwezi zitshabalalisi ze zisabele ngokwenza amaqhuma kwiingcambu. Yiyo loo nto abantu abaninzi beyibiza ngokuba yinemathodi yamaqhuma eengcambu le ntshulube.


Apolônia

Zebra - Iqwarhashe

Amaqwarhashe asondelelene kakhulu namahashe kwaye kunebali elinika umdla kakhulu elimalunga neenemathodi, amaqwarhashe kunye namahashe.

Kukho inemathodi encinci kakhulu (maluga nama400 μm ubude), i*Halicephalobus gingivalis*, ehlasela amaqwarhashe namahashe ngokusebenzisa izilonda ezivulekileyo okanye ngomlomo okanye impumlo. Zakube zingaphakathi, zihamba ngomjelo wegazi othi uzise kwizintso, kwisibindi kunye nasengqondweni apho ziye ziphindaphindane ngokukhawuleza kwaye zingabangela ukufa kweqwarhashe okanye ihashe elo.

Ukuba ulosuleleko luqatshelwe kwangethuba, iqwarhashe okanye ihashe lisenganyangwa ngempumelelo, kodwa kuba bambalwa abantu abaziyo ngale nemathodi kwaye ngenxa yokuba ezi ntshulube zingqukuva ziyakwazi ukumelana namayeza, amaqwarhashe kunye namahashe ayafa.