

Njūka-narua cia

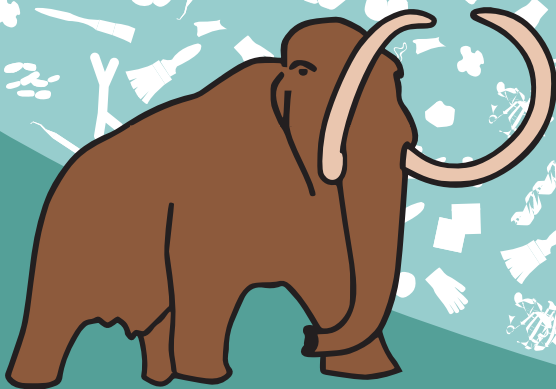
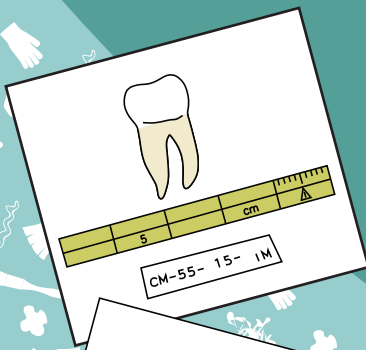
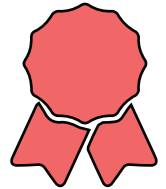


ŪMENYI WA MA WA ARCHAEOLOGY

Ibuku rĩrĩ nĩ indo cia:

Rĩtwa

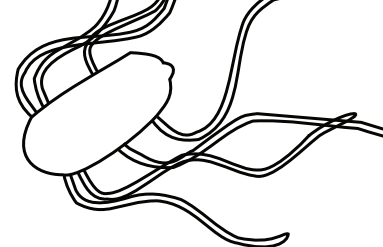
Ataaramu a Rūciũ a
Archaeology Thĩ-inĩ
wa Mathomo



Ibuku rĩrĩ rĩa rangi rĩharĩĩrio nĩ
Gĩtaĩ kĩa Max Planck Institute
for Evolutionary Anthropology

Njũka-narua cia

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for Evolutionary Anthropology

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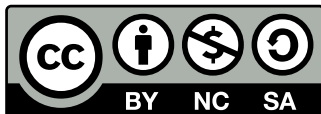
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Teresiah Mūthoni Thuku

Mūrūngi:

Elizabeth Wanjikū

Ibuku rīrī rīa rangi rīharīrīrio ta mūbango wa mathomo thī-inī wa kothi gūtarīria mīhano ya ūmenyi wa ma.



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2023



ITHUI TWIA

Ataaramu a archaeology ni atuiria ariā mahūthagira njira cia kīrīru gūtītīrithia ciūria cia maūndū ma thutha ma andū.



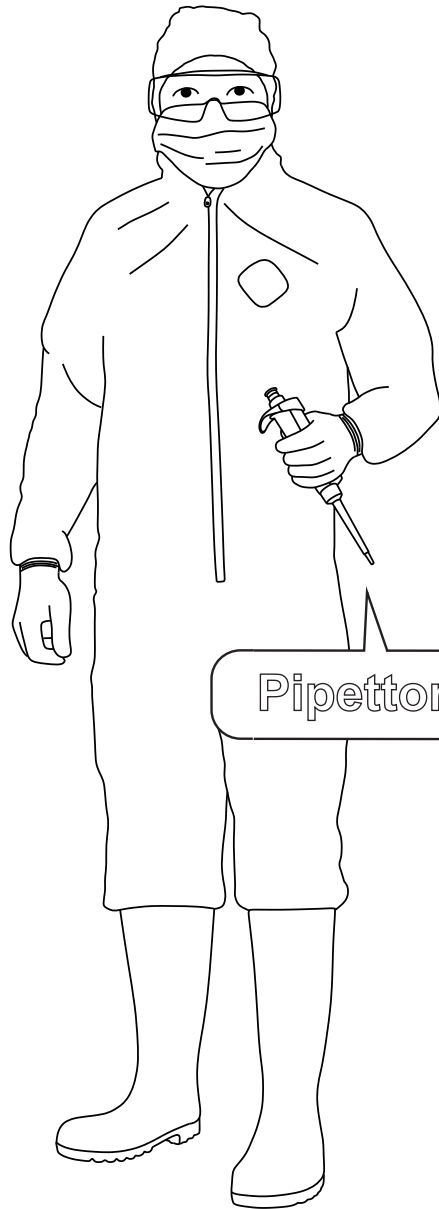
Gacakūri

Kīwanja-inī kīa ūmenyi...

Athuthuria a ūmenyi manyitanagira wīra-inī na archaeologists kwenja na gūcokanīrīria mīgerio nī getha īthomwo kīūmba-inī kīa ūcarīrīria. Ūndū ūyū no ūtaranīrie mūgerio wa makaburi, gūcokanīrīria matigari ma nyūngū cia tene mūno, gūtambūra mahīndī ma nyamū kīara-inī, kana gūcunga mūthanga gūcaria matigari ma mīmera ya tene mūno.

Rumu ya ūcarīrīria...

Rīrīa maramenyera DNA cia tene mūno, no nginya ataaramu marute wīra kīūmbainī gītheru na mekīre nguo cia mwanya, gīoko na mbuuti nī getha kūgitīra DNA cia tene mūno itigatukane na cia rīu. Ataaramu mahūthagira ithondeki na mīthooko ya mīthemba mīngī gūthoma mīgerio ya tene mūno.



Pipettor



GŪCTIMBA KĪWANJA-ṬNĪ KĪA ŪMENYI

Ataaramu a archaeology mathiūrūrūkaga thī yothe gūthuthuria hithitoria ya andū na hithitoria ya tene mūno. Thī-inī wa kuongerera ithondeki cia kwenja he kūdū gūbataraga mahūthīra na mīthooko ya mwanya. Kwa mūhiano kūrīa Himalayas, archaeologists mabataire marūa ma rūtha rwa thabarī na mīthooko ya kūhaica kīrīma.

Department of Tourism
TREKKING PERMIT

According to the rule 33 of the Nepal Tourism Act, 2018, the permission is granted to the District (except Kathmandu) to 19

NATIONAL TRUST FOR NATURE CONSERVATION
Entry Permit (ACAMCA/GCA)

Schedule - 2 (Relating to Sub-Rule (1) of Rule 19)

Receipt No. 0281630

Entry Permit No.

Full Name:

Date of Birth:

Passport No.

Nationality:

Purpose of Visit:

NTNC-ACAMCA ENTRY FEE RECEIPT

Ticket No. 0281630

Date

Received with the fee from Mr/Ms/Ms

Passport No.

Date of Issue

Agency Name: SHERPA SHARDA

Authorized Signatory

Nationality

TOURIST COPY

Migration Officer
No

Samdzong, Nepal



Calculus Cikonii Magego

No imenyekaga ta tartar ya igege, mwena uyū wa mwiri waku noguo ubuthaga wi muoyo. Niutegegaga irio na bacteria, na no uhuthike guthodekithia ugima na irio imenyeretwo kurio.

Mahindi na Magego

Thi-ini wa mahindi na magego kwina cienyu cia DNA iria ingihuthika gubuatirira uthami wa andu a tene muno na kuhithuria mauuthi, ta rangi wa njuiri na maitho, hamwe na mogaruruku ma mumbire. Magego ma andu makuire hindi ya murimu wa muthiro no makorwo na DNA ya kaha kiria kiamakorire.

Matigari ma Indo cia Riumba

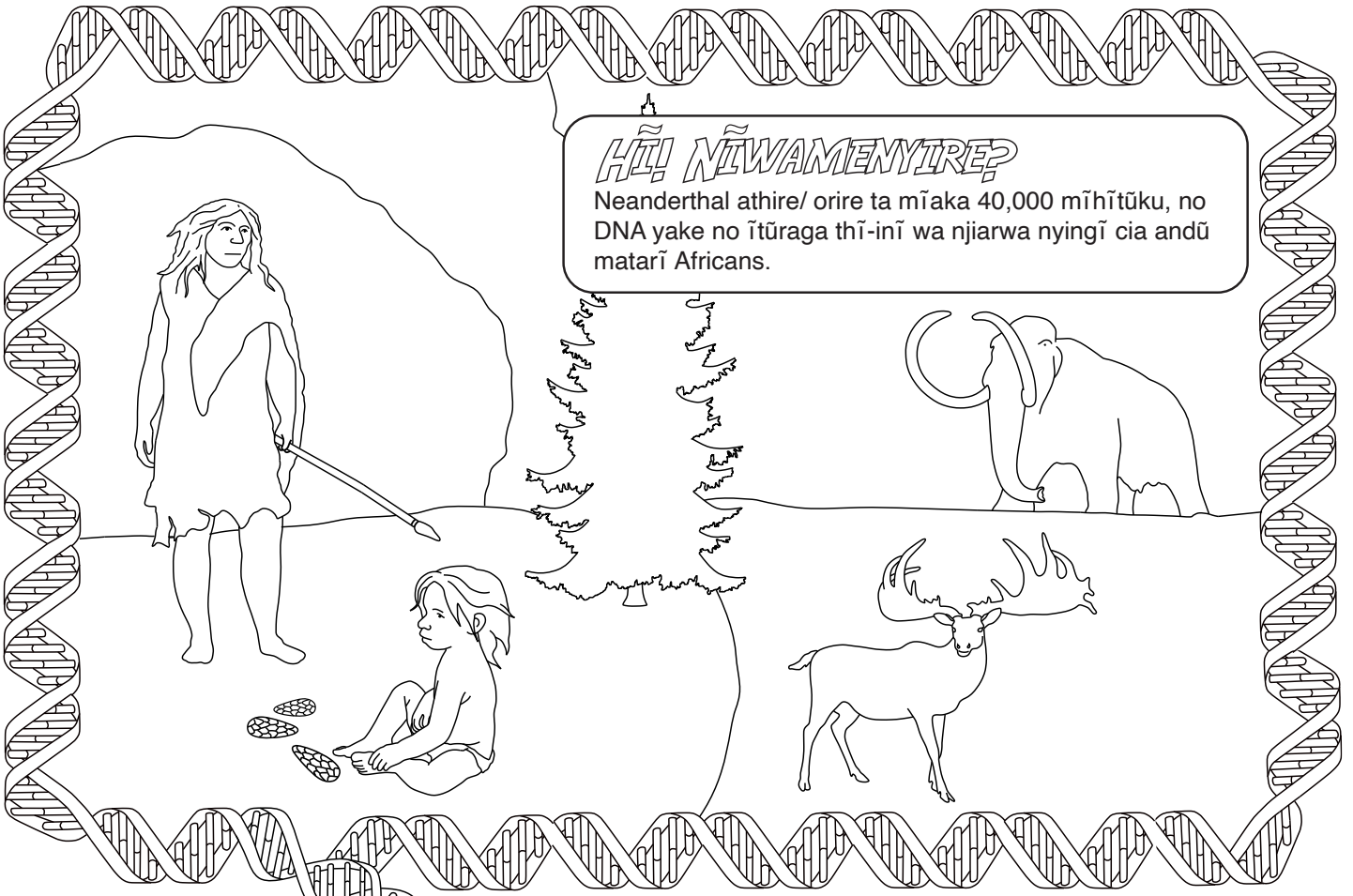
Makuro ma irio na matigari mangi thi-ini wa indo cia riumba no makorwo na protein cia mimeru na nyamu, twenyu twa mimeru tutangoneka, na matigari ma maguta ma kuruga. Muthutukano wa matigari ma irio thi-ini wa indo cia riumba no uhote gututhomithia uhoru wigi irio ciamenyeretwo kurio ni na murugire wa andu a tene.

KIRIA TURERUTA

Andu mena umenyi wa archaeology mahuthagira njira na technology cia kiriu gutithirithia ciuria cigi maundu ma thutha ma andu. Mena ithodeki iria ciagirire no mahote kuona umenyo muingi ona haria hena mugerio munini wa ihindi, igege, kana nyungu.

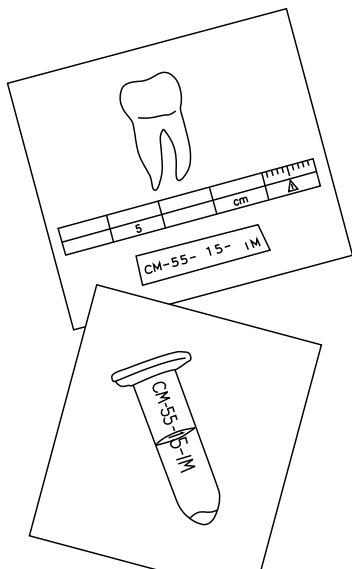
HĪ! NĪWAMENYIRE?

Neanderthal athire/ orire ta mīaka 40,000 mīhītūku, no DNA yake no itūraga thī-inī wa njarwa nyingī cia andū matarī Africans.



KĪHUMO KĪA ANDŪ

DNA cia tene citūteithagia gūtaūkwo waihwa aitū a hakuhi harī mūgarūrūkīre wa gūūka o kahora-kahora: Neanderthal.



Mūgarūrūkīre wa Gūūka o Kahora-kahora

Ūroori wa magego na mahīndī ma andū a tene mūno, no ūtūhotithie kūmenya ūrīa aciari a kīruka gīa tene-inī matūraga, na nīatīa ithuī ta andū twokire gūkorwo ciūmbe iiria tūrī rīu.



ŪTHAMI WA TENE

DNA cia tene cionekanīte kuuma na mahīndī na magego no cihūthīke kwerūhia ūthami wa tene mūno. Wagwatanio na mūthutūkanio wa isotopes, ta ūhūthīri wa radiocarbon gwīkīra tareke na mūthutūkanio wa strontium na oxygen isotopes, ūthami ūyū no ūkinyīrwo kuuma hīndī na hīndī kinya mwena na mwena.

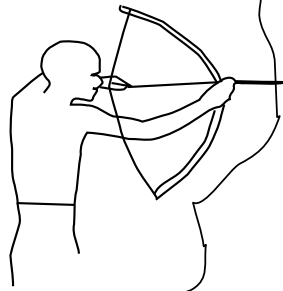
Asikuthi, Asia ya Gatagatī
Matukū ma kīgera, 700 mbere
ya Jesu



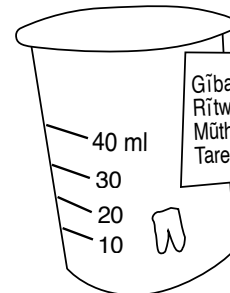
HŪ! NĪWAMIENYIRE?

Radiocarbon, kana ^{14}C , nī isotope īngīenyenyeka ya carbon īrīa īmerūkagio nī mīmera kuuma rīera-inī hīndī ya photosynthesis. Nyamū cimerūkagia radiocarbon thī-inī wa mīrīrī yao rīrīa ciarīa mīmera, ihinda rīahītūka radiocarbon nī ībuthaga.

Gūthima mūigana wa ^{14}C kuuma mūgerio wa tene mūno, no kūhotekeke kūiganania nīrī nyamū yatūrīte.



Gwīkīra Radiocarbon tareke



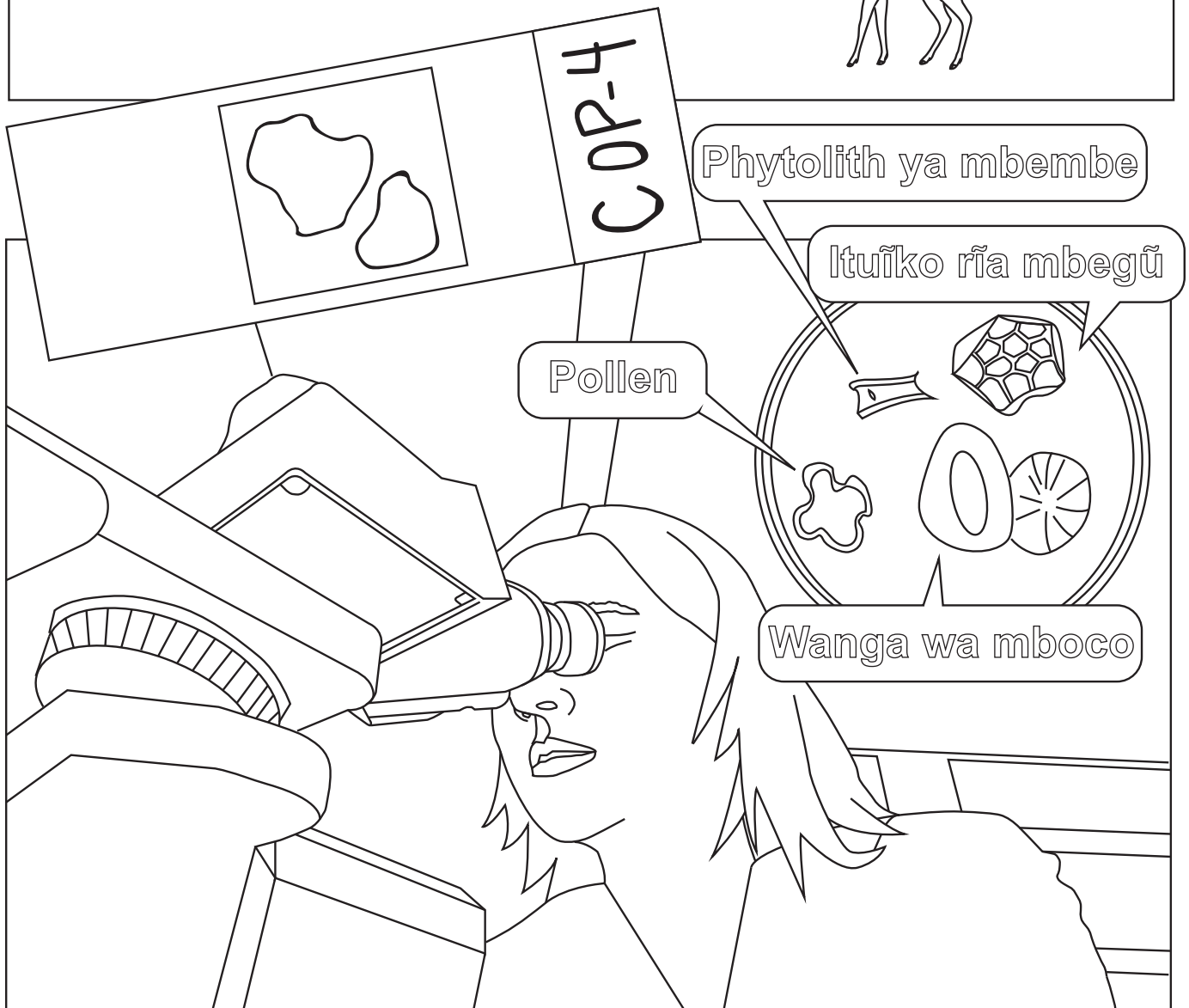
Gībandī kia Mūgerio:
Rītwa rīa Mūruti Wīra:
Mūthemba wa Mūgerio:
Tareke:

Gwīkīra Radiocarbon tareke nī njīra īngīhūthīka kūmenya riika rīa nyamū na mīmera ya ūkūrū wa mīaka 40,000.

IRIO CIAMENYERETWO KŪRĪO TENE

Ataaramu a ūmenyi wa ma no mahūthīre ndarubini kŭnenehia twenyū tŭnini twa irio thī-inī wa nyŭngŭ cia, na magego-inī ma andŭ a tene mŭno. Mŭthutŭkanio wa twenyū tŭtŭ ūtŭbundithītie ūhoro wīgiī irio irarīagwo nī andŭ a tene mŭno a Maya kuuma Mesoamerica makīria ma mīaka 2,000 mīhītŭku.

Copan, Honduras
Maya ya ūkŭngŭti, 300
thutha wa Jesu gŭkua

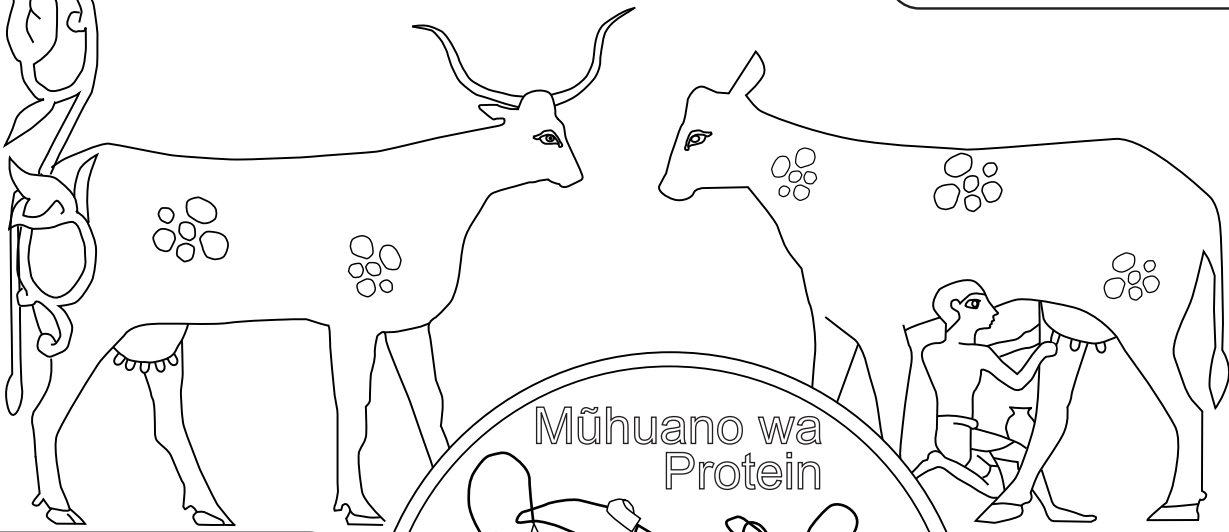


ŪRĪTHIA

Kwa makīria ya mīaka 10,000, andū makoretwo magīciarithia mīmera na nyamū kuona moimīrīro ma mwanya. Ng'ombe ciarī imwe cia nyamu cia irio ciarī cia mbere kūrīthio, na andū a tene macihūthagīra he ūkururia, kuona nyama, iria na ngothi.

HĪ! NĪWAMENYIRE?

Ng'ombe ciarīithio kuuma aurochs, īrīa nī mīthemba ya bovid nene cia gīthaka iiria irīkītie kūra. Wūira wa mbere wīgīī ūrīithi wa ng'ombe umīte Anatolian peninsula, kūrīa nī Turkey ya ūmūthī.

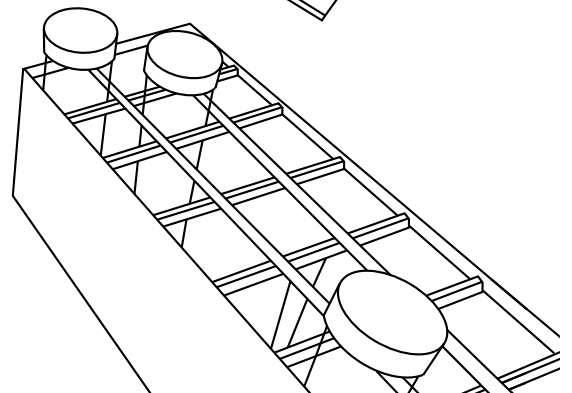
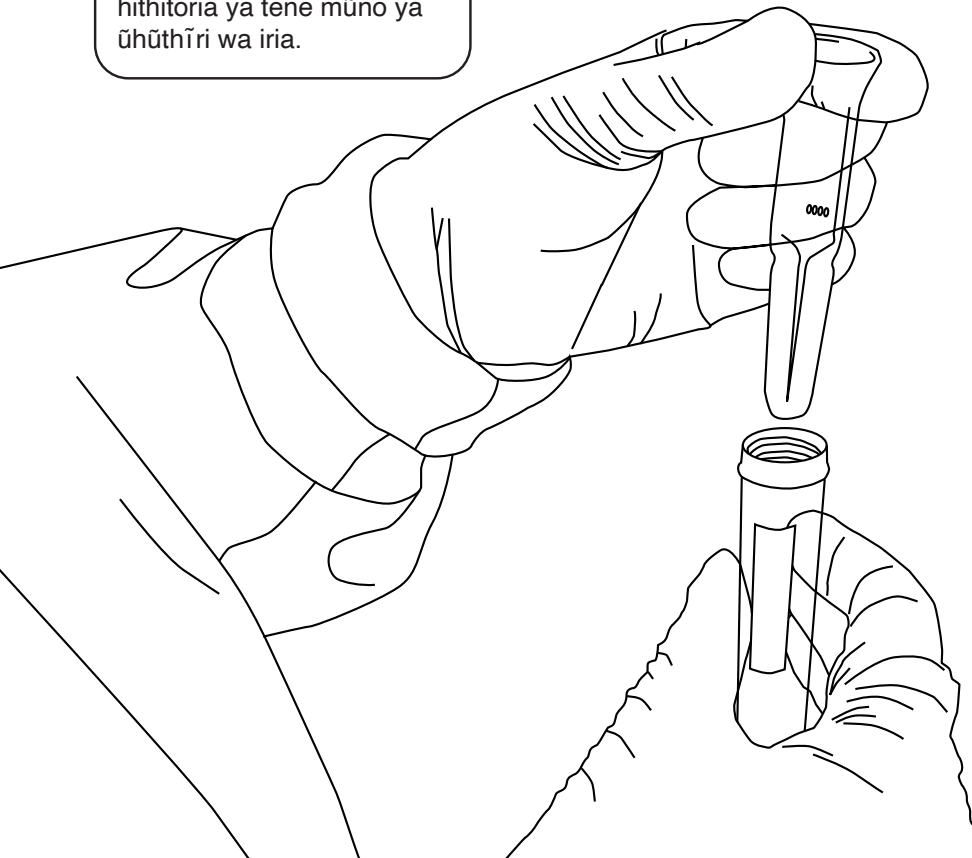
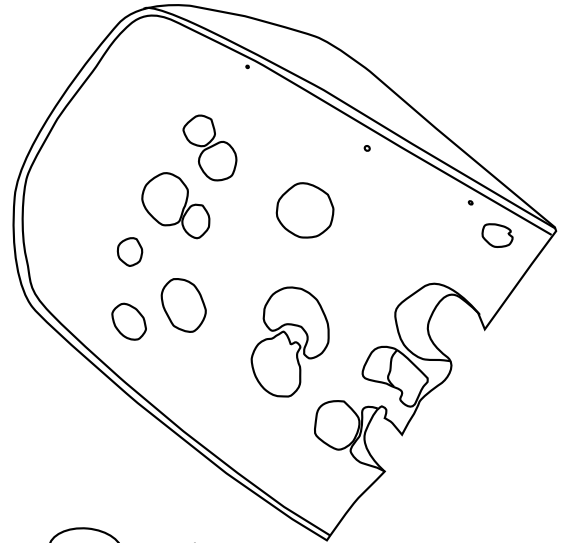
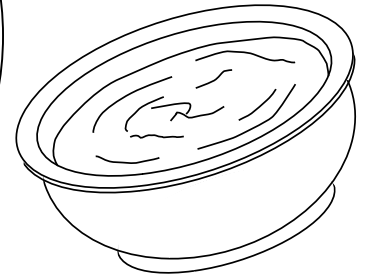


Mūhuano wa Protein



Kīhumo kia iria

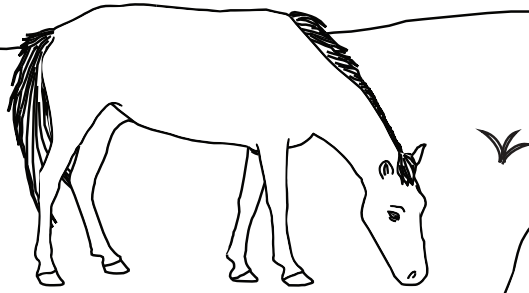
Kīhumo kia ūhūthīri wa iria gītirī kīamenyekana wega, no amenyi a ma a archaeology ni marahūthīra ūbundi wītagwo mass spectrometry kūgudūria proteins cia iria irī thīnī wa magego ma tene mūno nīgetha gūthondeka hithitoria ya tene mūno ya ūhūthīri wa iria.



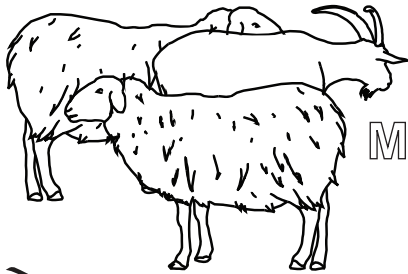
Mongolia

Mĩthemba mĩngĩ ya nyamũ ĩtũraga muurũa-inĩ wa steppe ya Mongolia, ta mbarathi, ng'ombe, yaks, ng'onde, mburi, reindeer, na ngamĩra. Arĩithi a gũthama thama moimithagia maciara ma iria kuuma nyamũ-inĩ ici ciothe.

Mbarathi

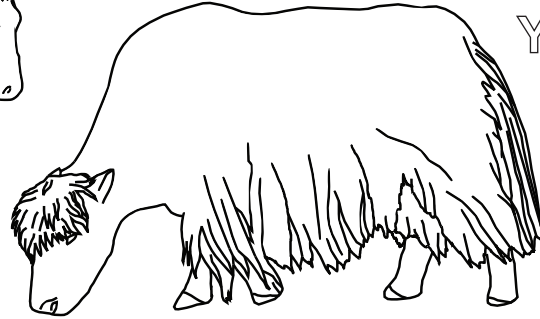


Ng'onde

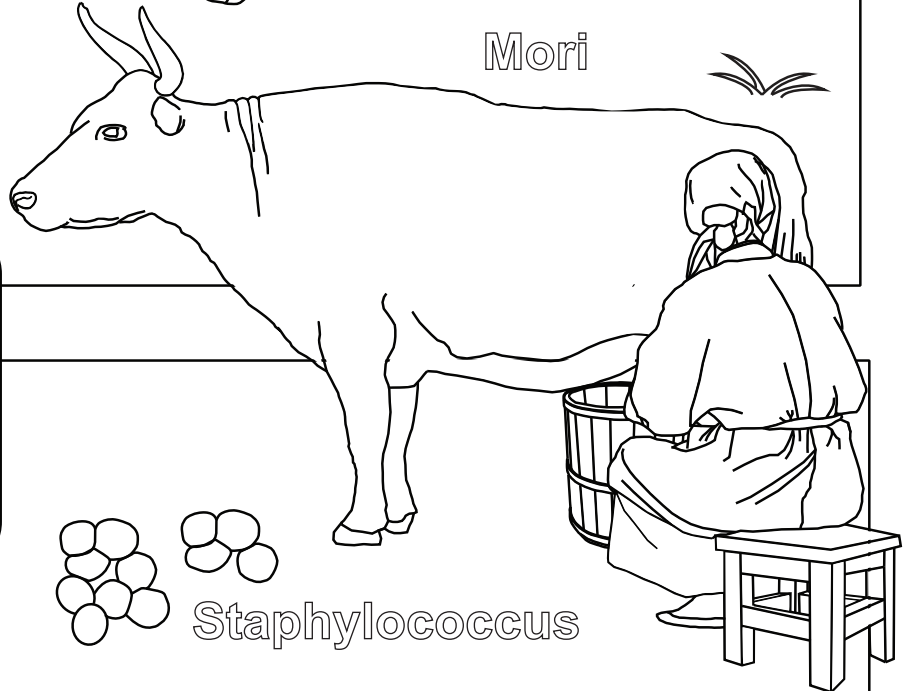


Mburi

Yak

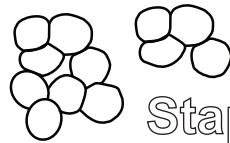


Mori

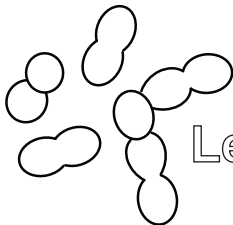


IRIO CIA IRIA

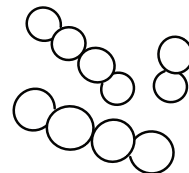
Irio cia iria ci bata mũno he mũtũrĩre wa omũthenya bũrũri-inĩ wa Mongolia. Kuumana na ũcarĩrĩria wa archaeology nĩ tũmenyete ũndũire ũyũ ũtambũrũkĩte nginya gia mĩaka 3,500 mĩhĩtũku.



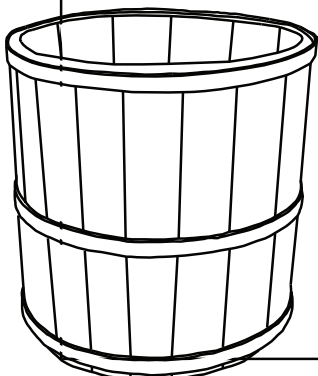
Staphylococcus



Leuconostoc

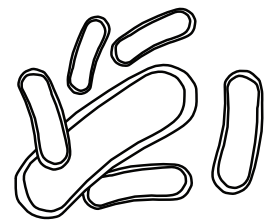


Lactococcus



Microbes cia iria

Microbes- makĩria ma bacteria na yeasts – irutaga wĩra wa bata harĩ gũthondeka mĩthemba mĩngĩ ya irio cia iria ciũtkaine, ta yoghurt, thiagĩ, na cithi, na nginya irio citoĩkaine wega, ta **aruul** ya Mongolia (ngindi cia iria ciũmithĩtio) na **airag** (njohi ya iria rĩa mbarathi).



Lactobacillus

MĪRIMŪ YA TENE MŪNO

Mahīndī, magego, na tartar ya igego cigaga mūthithū ūmenyi wa bata igūrū rīa ūgima wa mwīrī wa andū a tene mūno. Kwa mūhiano, DNA na proteins itūire thī-inī wa tartar ya igego iteithagia ataaramu gūtaūkwo hithitoria ya mūrīmū wa kīni na gūbutha kwa magego.



Omne Bonum

Omne Bonum nī encyclopedia ya kīLatin ya 14th century īkonīī mūtūrīre hīndī ya European Middle Ages īgīt two thī-inī wa British Library. Rītaranīrītie rīandīka rīa ūtaaramu wa magego na ūrigitani wa arwaru iiria itūteithagia gūtaūra wega mīrīmū na ūgima hīndī ya medieval.



non xx... p archis in rosa... Nunc sequit... de... dentibz p... dentes fin... gregos d... nunt q... odente... omni... Ap... du... res... dicit p... sunt de...

res fm a? mesam plantia in ossibz max... allaz 2 meum quibzdam jacobz manu 2 sut... in maxillaibz

quos priores p... a dulcora sup me...

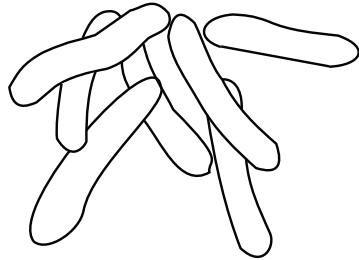
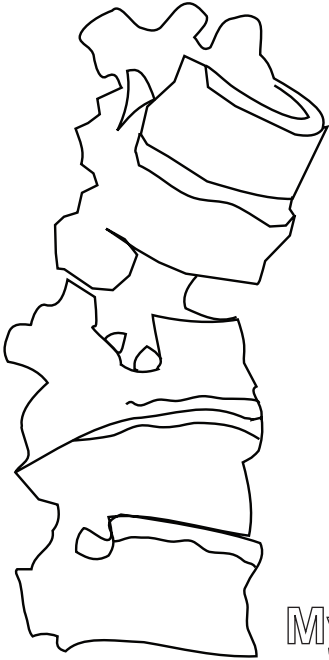
color qui oculis dicitur... nec dimum 2 molle quod... aat 2 rāmen aliquis est y... fāate est. explicare non... sup johem... in utrimq Affiat: omnis... sugges... ebomite... tes in medio civitatis in... sedite opibz mentes m... ptemone custodiant. Si... omni denotionis portan...

omni... n m... pro... tris... loise... mho... ns S...

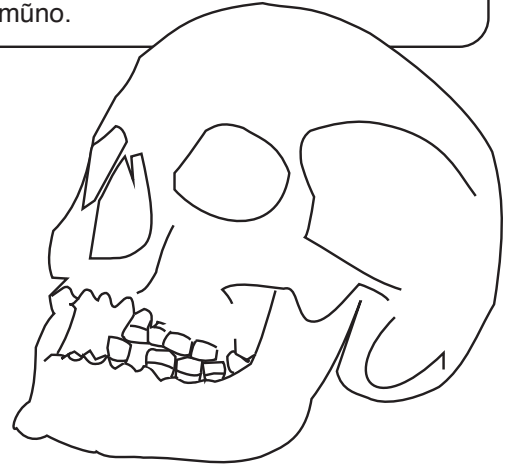
postor in solo spe... mento fieri iohes m... is e... on... 'su... om... up... ogi... gl... uer... n s... tra... su... an... m... ula...

MŪRIMŪ WA GĪTHŪRI NA MAANGŪ

Mŭrimŭ wa gĭthŭri na maangŭ ũrehagwo nĭ bacteria ikonaniĩ: *Mycobacterium tuberculosis* na *Mycobacterium leprae*. Ciothe no itharĭkĭre mahĩndĩ, na matigari ma DNA thĩ-inĩ wa mŭtambarara wa mahĩndĩ mateithagia ataaramu kwerŭhia hithoria ya mĭrimŭ ya tene mŭno.

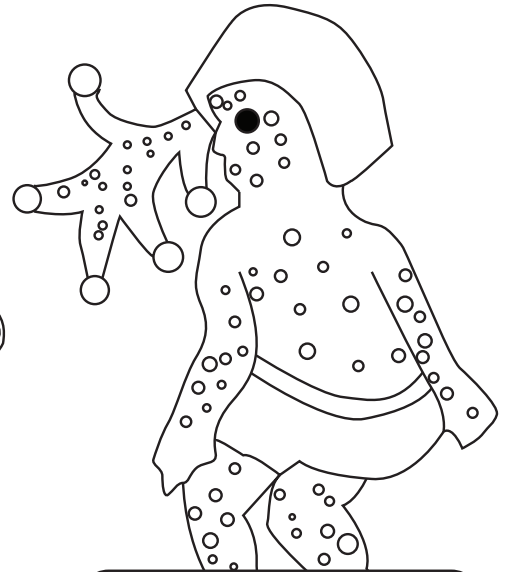


Mycobacterium leprae



COCOLIZTLI

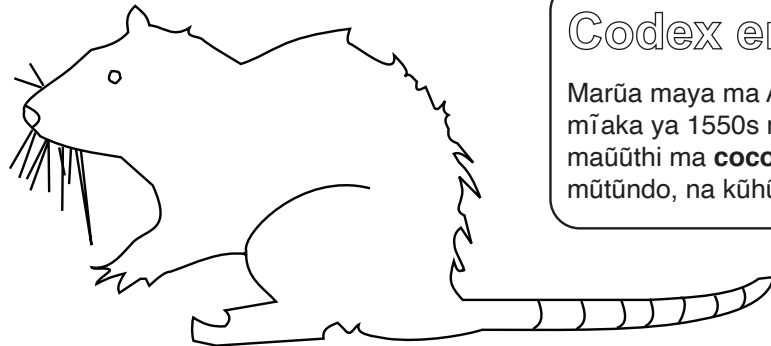
Mŭrimŭ wa mŭthiro ũtaramenyekana- wĭtĭtwo **cocoliztli** nĭ Aztecs- ũroragire 60-90% ya mŭingĭ wa andŭ a Mexico gatagatĩ ka 1545 na 1550 thutha wa Jesu gŭkua. Ica-ikuhĩ, DNA kuuma pathogen ya *Salmonella enterica* Paratyphi C nĭ ĩrĭkĭtie kuonekana thĩ-inĩ wa magego ma andŭ makuĩte nĭndŭ wa mŭthiro ũcio.



Salmonella enterica

Dk. Schnabel

Marĭgĭtarĩ arĭa marigitaga anyamarĭki a mŭrimŭ wa ngaĩ meekĭraga tŭrembeke twahanaga tŭnyoni nĭ getha kwĭrigĭrĭria kuumana na "rĭera rĭthŭku."

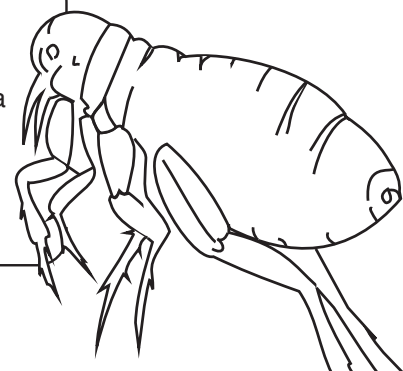


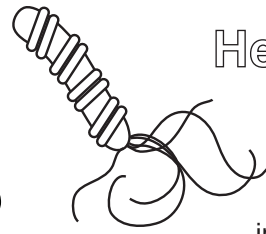
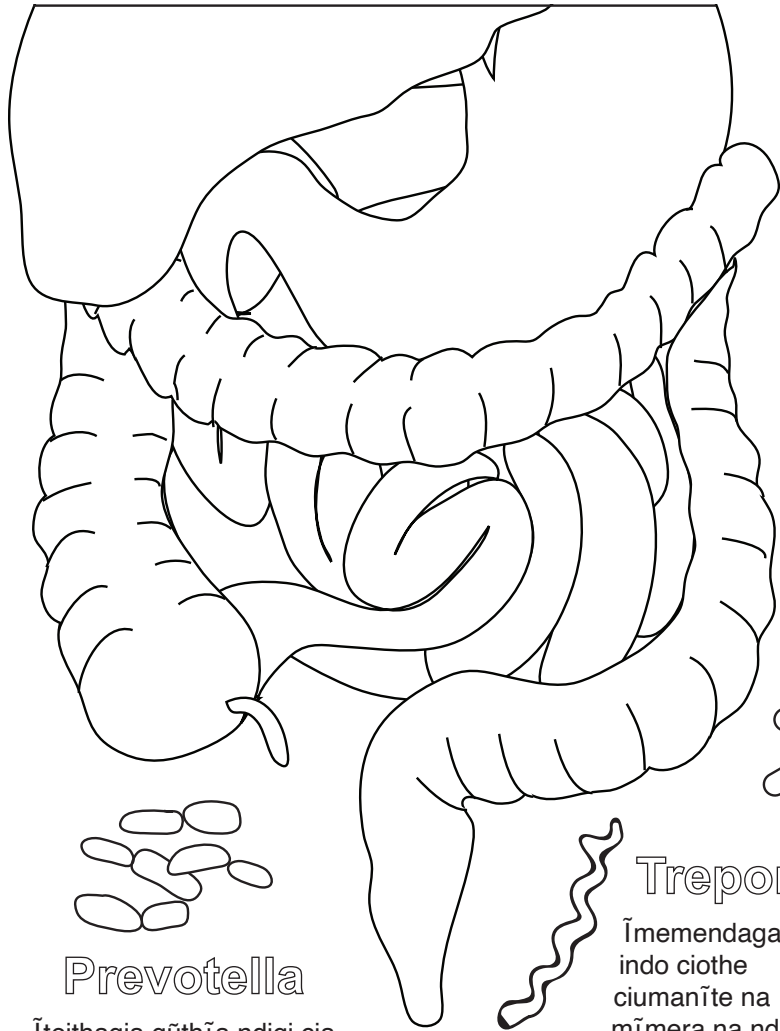
Codex en Cruz

Marŭa maya ma Aztec ma mĭaka ya 1550s maronania maũthi ma **cocoliztli**: ũrugarĩ, mŭtŭndo, na kŭhŭngŭka.

MŪRIMŪ WA NGAĪ

Mŭrimŭ wa ngaĩ ũrehagwo nĭ bacterium ĩtagwo *Yersinia pestis*, ĩrĭria ĩtambagio ni iroboto iiria ciaikaraga maguoyainĩ ma mbĭa. Mŭndŭ wothe warŭmĭtwo nĭ iroboto ici agwatire mŭrimŭ wa ngaĩ. Mŭrimŭ wa ngaĩ warĩ gĭtŭmi kĭa **Black Death** mwaka-inĩ wa 1346-1353 thutha wa Jesu gŭkua ũrĭa woragire nuthu ya mŭingĭ wa rŭraya.





Helicobacter
pylori

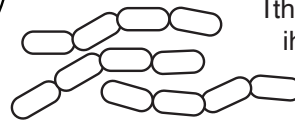
Íkaraga thĩ-inĩ wa
nda na ni gītūmi kĩa
ironda cia nda na cancer



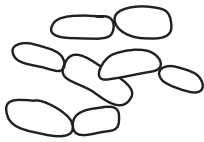
Bifidobacterium

Íteithagia tũkenge
gũthĩa iria

Faecalibacterium



Íthondekaga irio iiria
ihũthĩkaga nĩ cells
cia mara



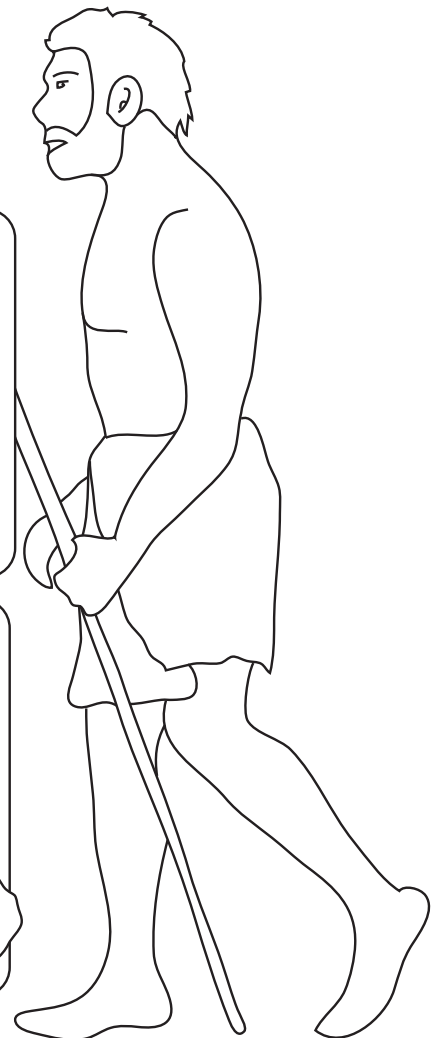
Prevotella

Íteithagia gũthĩa ndigi cia
mĩmera



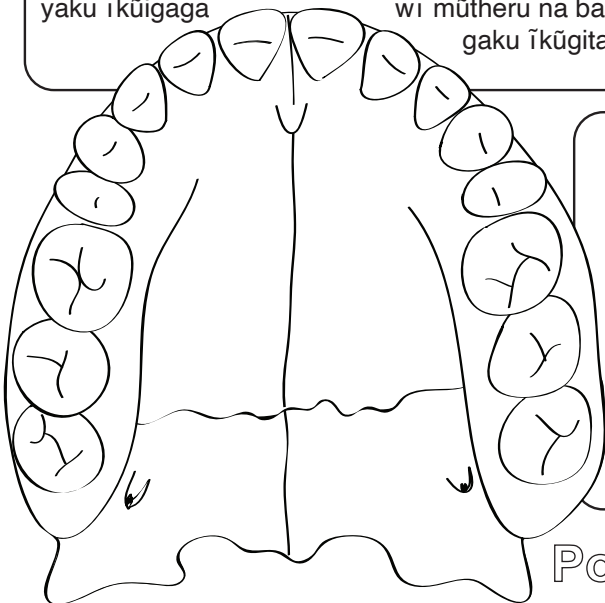
Treponema

Ímemendaga
indo ciothe
ciumanĩte na
mĩmera na ndigi
cia irio



MICROBIOME CIA AARIŪ AITŪ A TENE

Mwĩrĩ waku nĩ mūciĩ wa **trillions** cia cells cia bacteria, na hamwe ciĩtagwo microbiome yaku. Bacteria iiria citũraga thĩ-inĩ wa mara maku cigũteithagia gũthĩa irio na gũtigĩĩra tũtiranyitwo nĩ mĩrimũ. Bacteria ĩrĩa ĩĩ ngothi-inĩ yaku ĩkũigaga wĩ mũtheru na bacteria ĩrĩa ĩtũraga kanua-inĩ gaku ĩkũigitagĩra kumana na mĩrimũ.



HŪ!
NĪWAMENYIRE?

Ataaramu nĩ mareruta
calculus ĩkoniĩ magego
na mai nĩ getha gũtaũra
ũciari wa microbiome na
kũrugũra wega itũmi
cia mĩrimũ.



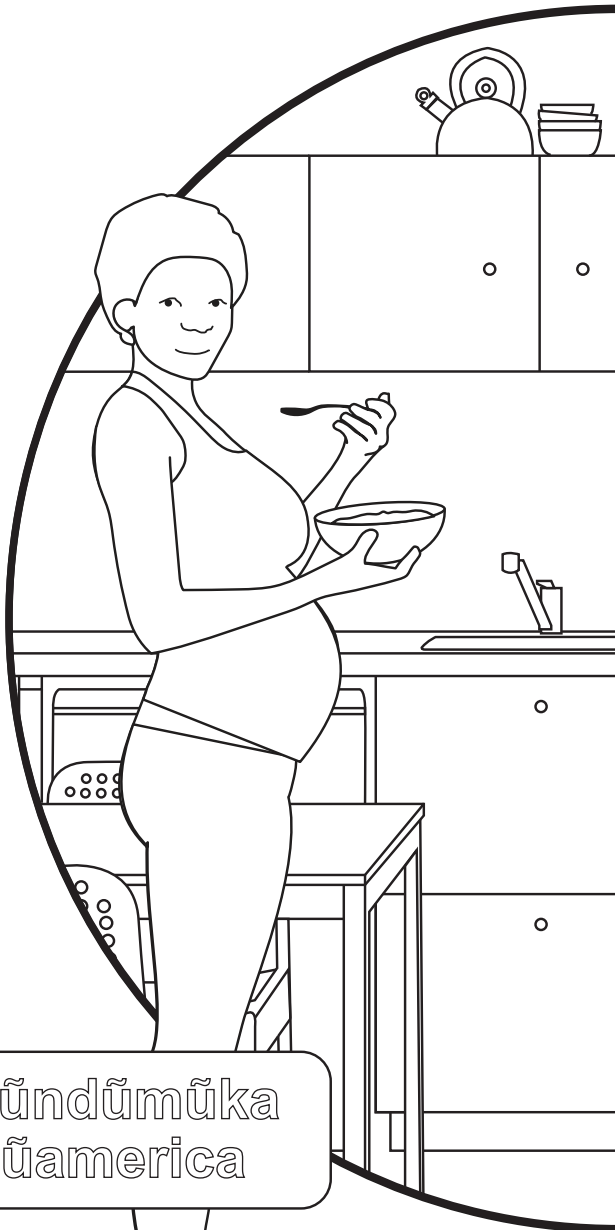
Porphyromonas

MAATHA

Maatha, ningĩ nĩ moĩkaine ta aguĩmi-ongania, marĩaga irio cia gĩthaka, na irio iiria mamenyerete kũrĩa ikoragwo irĩ cia imera itiganĩte.

Mbere ya ngirigaca kũambĩrĩria ta mĩaka 10,000 mĩhĩtũku, andũ othe a thĩ mararĩ ongania.

Ongania a ũmũthĩ mena microbiomes cia nda cia mĩthemba mĩingĩ gũkĩra andũ a ũndũire wa iganda-inĩ.



Mũndũmũka
mũamerica



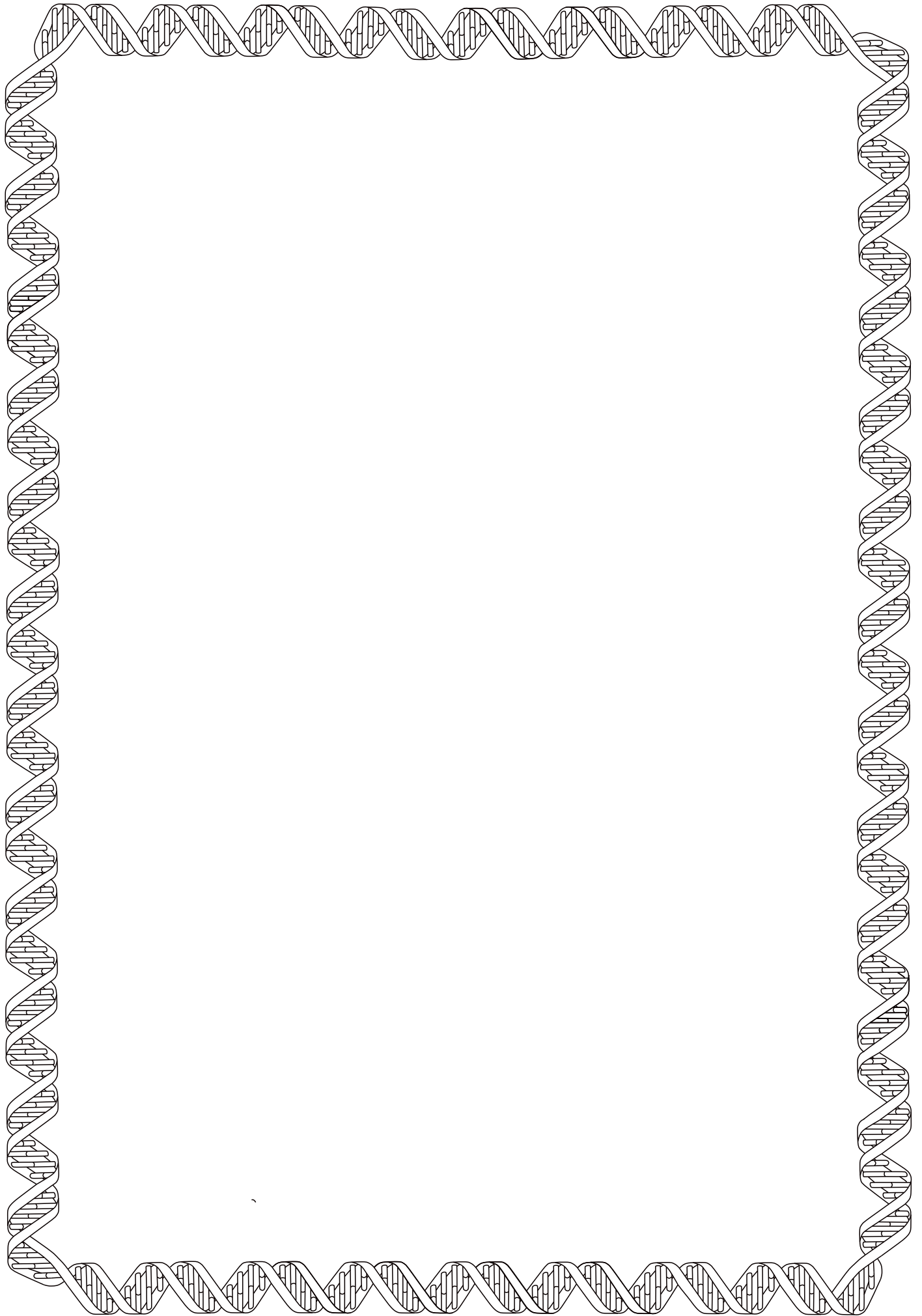
Mũndũmũka
mũhadza na
mwana,
Tanzania

ŪNDŪIRE WA IGANDA-INĨ

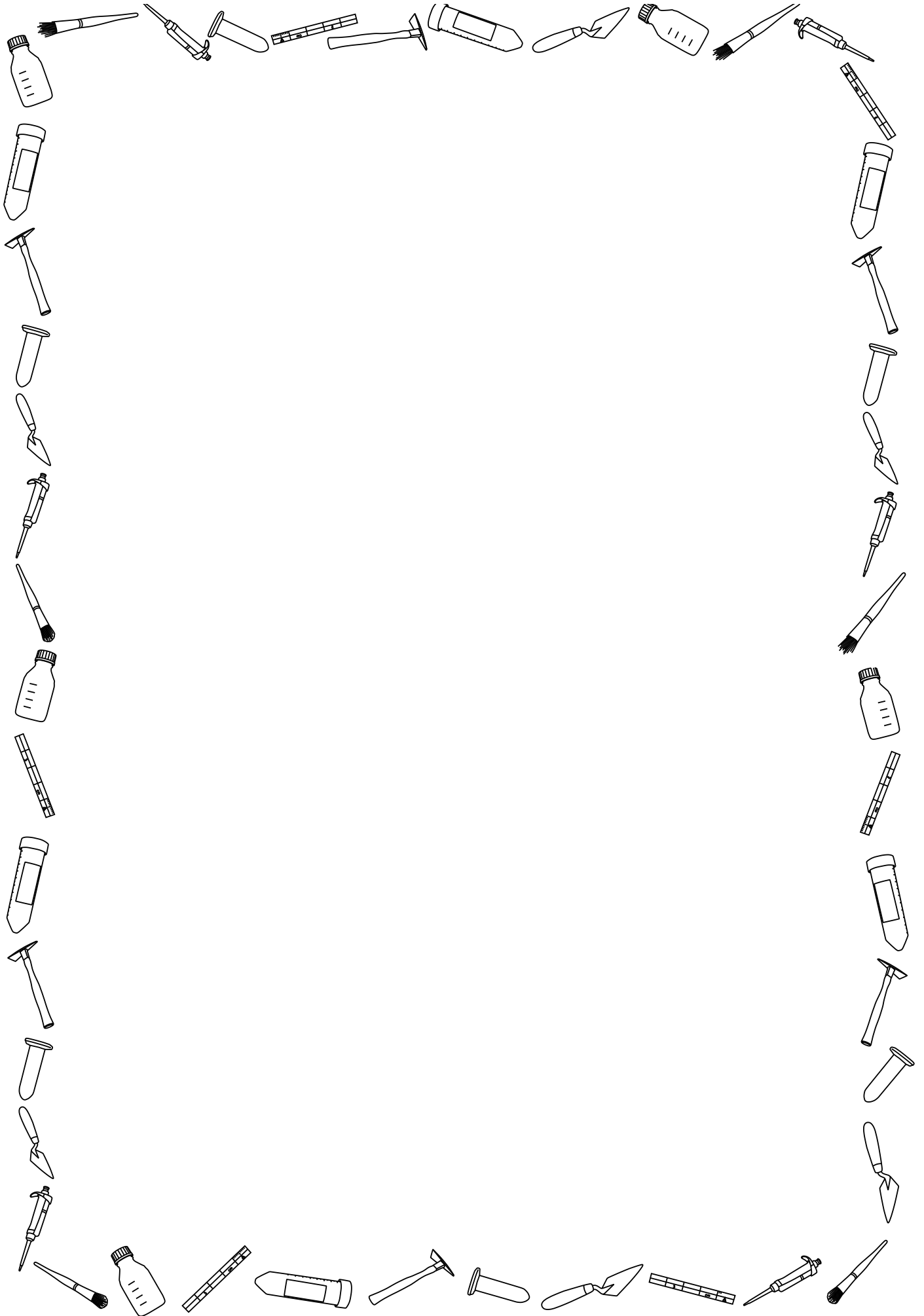
Ūndũire wa iganda-inĩ marĩaga irio cia ngirigaca makĩria, na uthondeki wa irio ni mĩhũgo ya mwanya irĩa irutagwo nĩ a nini.

Ūthondeki, kũrinda, na kũiga mũthithũ nĩ ũũthĩ wa bata mũno he mũnyororo wa irio cia iganda-inĩ, na irio ithiaga thabarĩ ndaihu kamũira ikinyĩte kũrĩo.

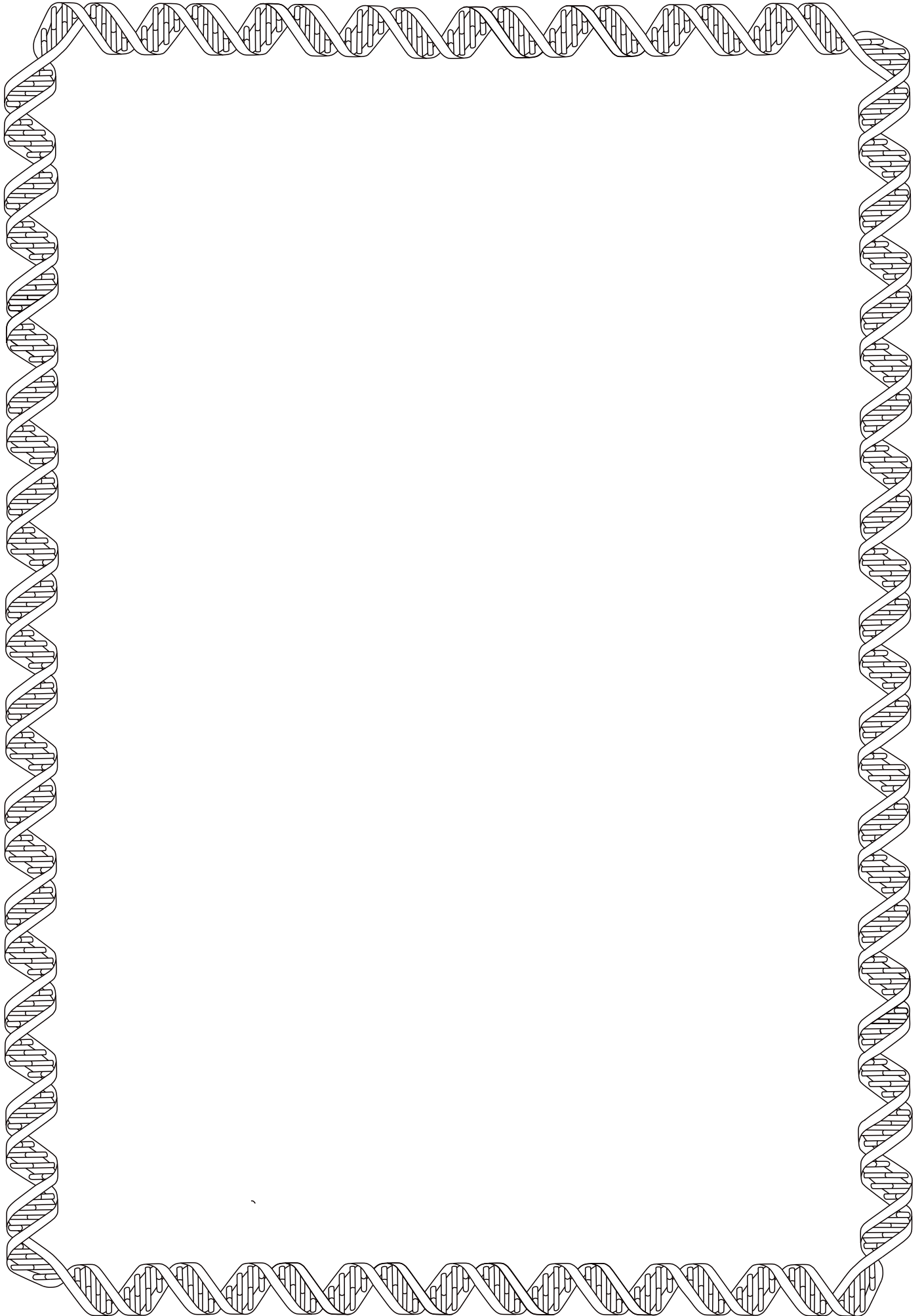
Andũ thĩ-inĩ wa ũndũire wa iganda-inĩ wa ũmũthĩ makoragwo na microbiomes cia nda itarĩ cia mĩthemba mĩingĩ, iiria imaignaga ũgwati-inĩ mũnene wa kunyitwo nĩ mĩrimũ ya kũhuhĩrĩria na ya gũtũũrĩria.





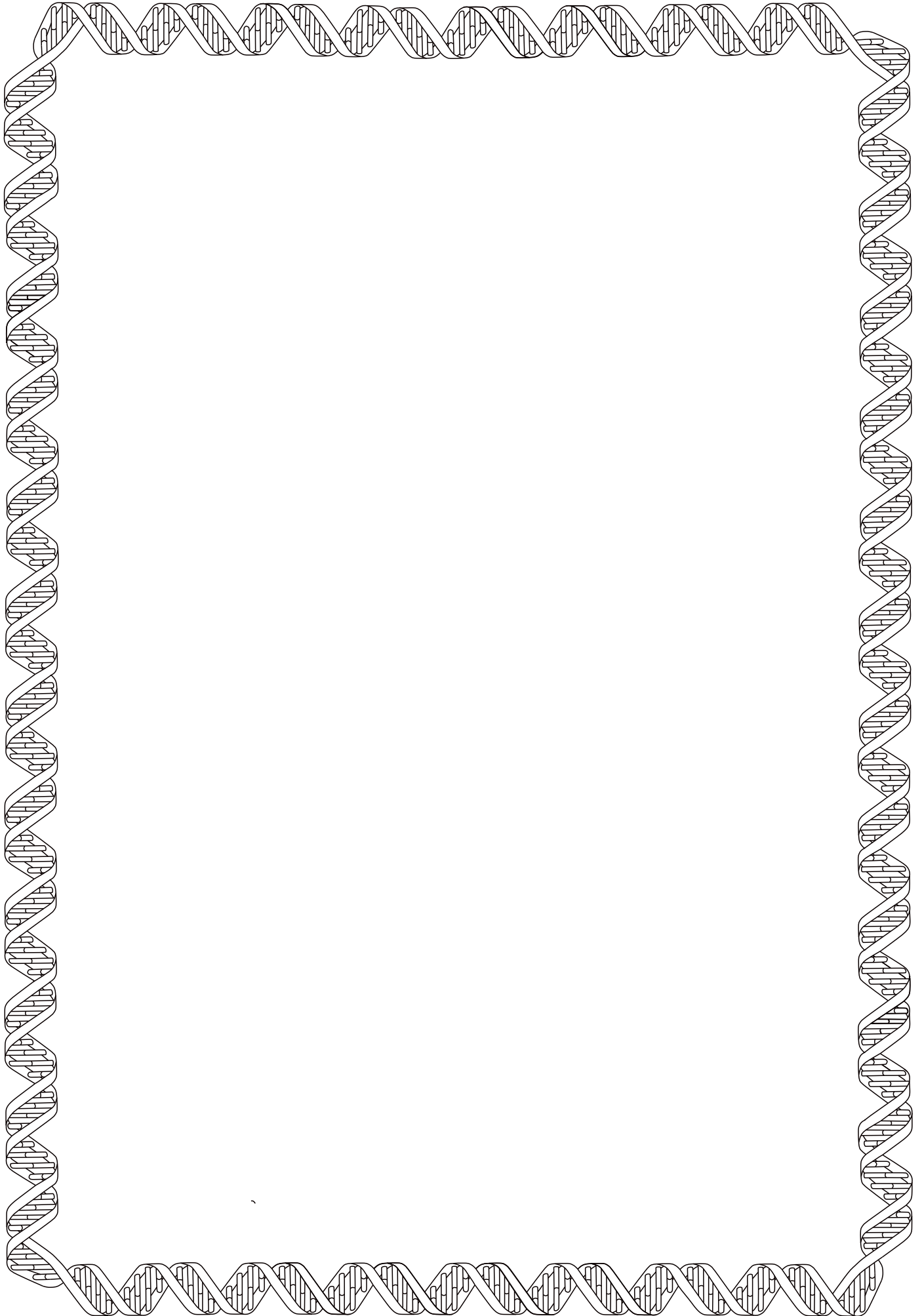






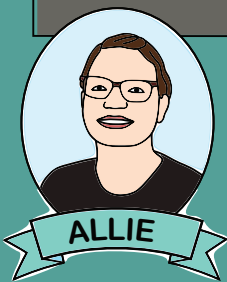




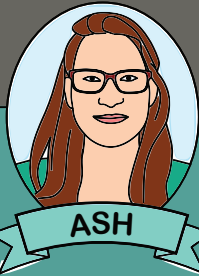




Gītafī kīa The Max Planck Institute for Evolutionary Anthropology



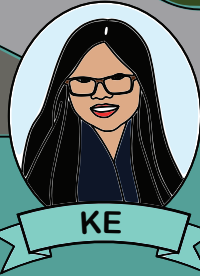
ALLIE



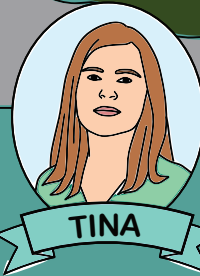
ASH



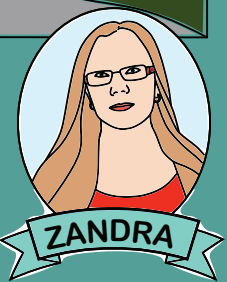
JESSIE



KE



TINA



ZANDRA

Njũka-narua cia

ŪMENYI WA MA WA ARCHAEOLOGY Ibuku rĩa Rangi

Wĩbundithie ūrĩa archaeologists na amenyi a ma marutaga wĩra hamwe gũcokia ciũria ciĩgĩĩ ūhoro wa tene wa andũ! Nyitanĩra na ithuĩ tũgĩtarĩria **ithuĩ twĩ** a na **kĩria tũthomaga**, kuuma **kĩhumo kĩa andũ** nginya gĩa **mĩrimũ ya ngaĩ**. Wĩyũhĩgie igũrũ rĩa **ũthami wa tene** na **ũhũthĩri wa radiocarbon gwĩkĩra tareke**. Rora ūrĩa amenyi a ma merũhagia **irio ciamenyeretwo kũrĩo tene** kuuma kwa matigari ma mĩmera. Umbũria ma ya gũkenerera ya **urĩithi** na ūtaaramu wĩgĩĩ irio cia **iria**. Tuĩria **mĩrimũ ya tene mũno** na **mĩrimũ ya mũthiro** na ūrundũrie **microbiome** cia **aariũ aitũ a tene**.

Rĩthondeketwo nĩ amenyi a ma a Gītafī kīa
Max Planck Institute for Evolutionary Anthropology

Rĩtaurĩtwo na Gĩkũyũ nĩ Teresiah Mũthoni Thuku, Elizabeth Wanjikũ



TERESIAH



ELIZABETH