

B'eenik sa

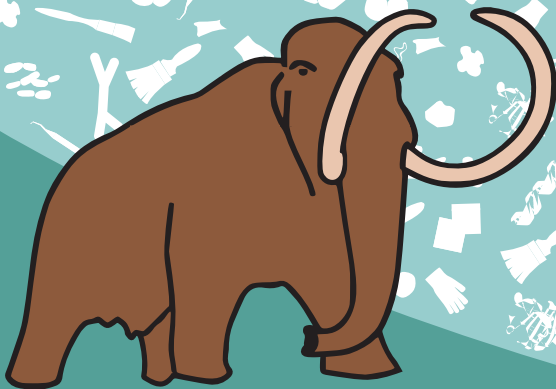
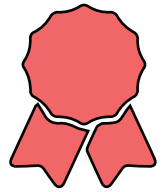
# NA WINK UT TZOLOK RIK'IN JUNXIL NA 'LEB'



li hu ha'in re:

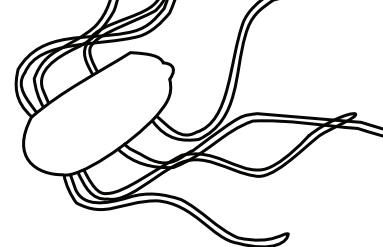
K'ab'a'ej

Laj tzoloneleb' te'wanq  
chi ub'elaj chirix junxil  
na'leb'



Jun Ju re b'one'k  
Ha'in Max Planck tzolleb'aal  
rik'in chan ru wank qayu'am





B'eenik sa

**NAWINK UT TZOLOK**

**RIK'IN JUNXIL**

**NA'LEB'**

li hu ha'in re:

K'ab'a'ej

Laj tzoloneleb' te'wanq  
chi ub'elaj chirix junxil  
na'leb'



Jun Ju re b'one'k

Ha'in Max Planck tzolleb'aal  
rik'in chan ru wank gayu'am



**Eb laj puktesinel:** Sa' tzolleb'aal Max Planck chirix xjalajik lix yu'ameb' li poyanam

**Laj k'uub'anel aatin re li hu:** Christina Warinner

**Lix tenq' lah tz'ilol tz'iib':** Jessica Hendy

**Xe'kub'sink:**

Zandra Fagnäs

Jessica Hendy

Allison Mann

Åshild Vågene

Ke Wang

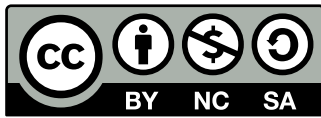
Christina Warinner

**Li jaltasinb'il sa' aatinob'aal Q'ekchi' xb'aan:**

Elvia Bo

Jose Mes

li ju ha'in yiiib'anb'il choqre xkomon tzolonik xk'utb'al lix reetalil na'leb' amolb'il chi tz'akal sa'.



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2023



# ANILJOH

Laj tzoloneleb' ha'aneb' yookeb' xtz'ilb'al ut xk'uxlankil rix junxil na'aje yookeb' roqsijom chi ch' olch'o nawink ut xtzilb'al rix li patz'om chirix chanru xwankjo'jik lix yu'am li poyanam sa' junxil kutank.



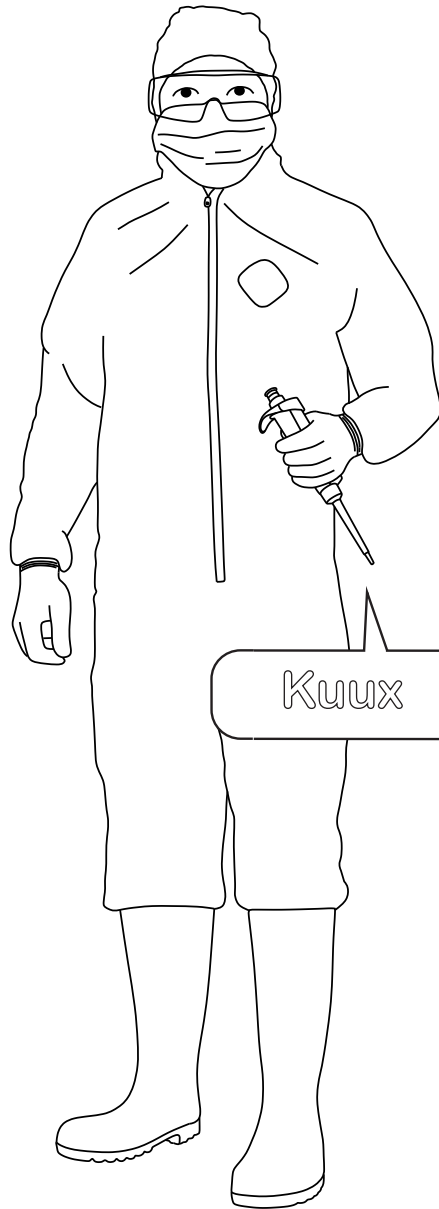
Paal

## Sa' na'aje (ch'och') k'anjelob'aal

Laj tzoloneleb' nake' k' anjelak chi nach' rik'in laj pikonel sa' najter na'aje re pikok ut xokb'al reetalil re chix tz'ib'al sa' rochochil xk'anjelankil. Ha'ineb' wank xreetalil xna'ajeb' li kamenak, xeeleb' uk'al, xtawb'al xb'akel li xuleb' sa' xjulil tz'eleb'aal ut tz'ilok xeelil ch'och' awimq.

## Sa' ochoch re tz'olok

Ha' anak yookeb' xch'eb'al li najter xralal xk'ajol li xe'toon, la tzolonel tento tyamlesimb'il xna'aj ut chab'il t'ikr, lix ramb'al li uq' rik'in xaab' re xkolb'al li najter reetalil xralal xk'ajol xe'toon rik'in ink'a ok lix tz'ajnil lix rala xk'ajol awank sa' li kutank anajwank. Laj tzoloneleb' jalan jalaq li k' anjelob'aal neke' roksi re xtzolb'al rix li najter reetalil.



Kuux



# PIKOK CH'POCH'

Ha'aneb' laj tzoloneleb' chirix esilal rejunxil na'ajej xe'xb'eeni chijunil ruchich'och' re tawok ut chix tz'ilb'al rix wanq'o'jikeb' poyanam ut lix wanq'o'jikeb' sa' li junxil kutank. Rik'in k'aru tz'aqal k'anjelob'aal aajel choqre k'anjelak. Qa yejak , kama' sa' tenamit Himalaya, laj pikoneleb' tento k'eeb'ileb' xhu re xb'eenikeb' sa tz'uul ut k'anjelob'aal re lochte'ek.

Department of Immigration  
**TREKKING PERMIT**  
accordance with the rule 33 of  
the permission is for  
in the area of Mustang  
District (except  
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:

**NATIONAL TRUST FOR NATURE CONSERVATION**  
NTNC-ACAMCA  
**ENTRY FEE RECEIPT**  
Ticket No. **0281630**  
Date  
Nationality  
Authorized Signatory  
SHERPA SHAIKUN-LA

Department of Immigration  
TREKKING PERMIT  
accordance with the rule 33 of  
the permission is for  
in the area of Mustang  
District (except  
to 19

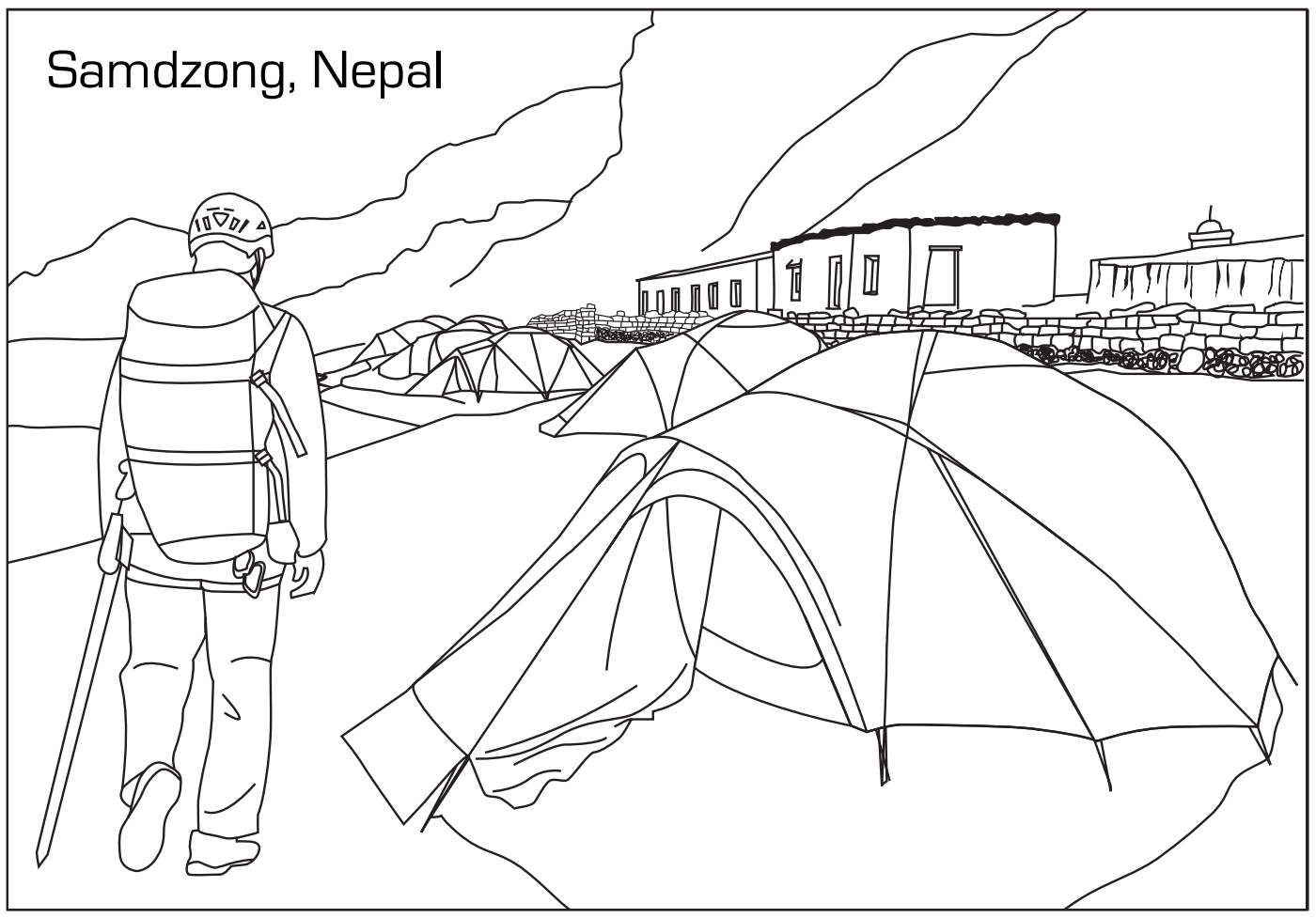
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gration Officer  
da No

## Samdzong, Nepal





## Xpekul ruuch e

Li tz'aj xkawu chiru ruuch e, ka'ajwi wank sa li junxaqalil nah kawu naq toj yo'yokoj. Ha'an naxchap tzekeem ut tz'aj, naru yuib'ankil xkawilal ut rik'in chab'il tzekeem.

## B'aq rik'in ruux e

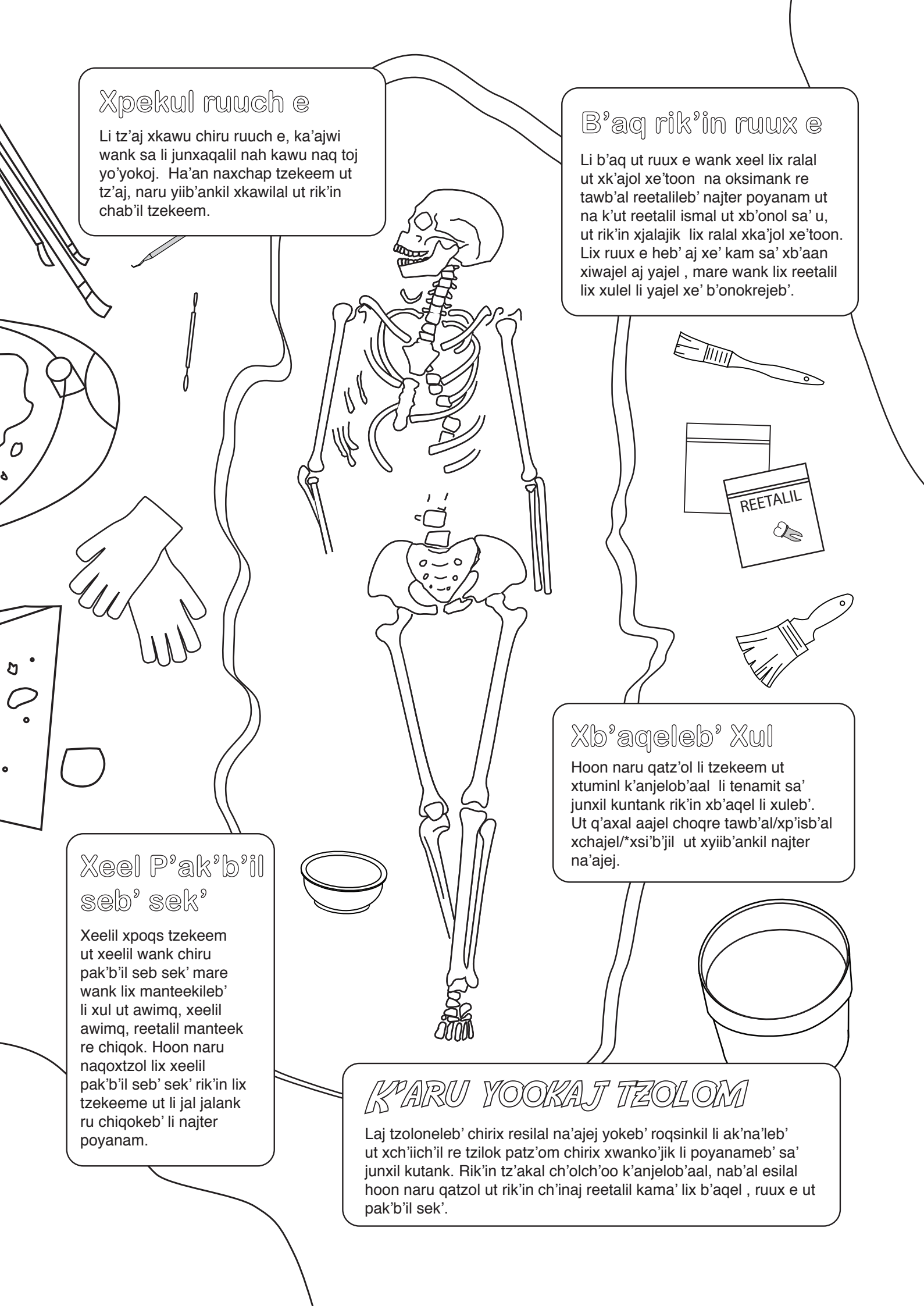
Li b'aq ut ruux e wank xeel lix ralal ut xk'ajol xe'toon na oksimank re tawb'al reetalileb' najter poyanam ut na k'ut reetalil ismal ut xb'onol sa' u, ut rik'in xjalajik lix ralal xka'jol xe'toon. Lix ruux e heb' aj xe' kam sa' xb'aan xiwajel aj yajel, mare wank lix reetalil lix xulel li yajel xe' b'onokrejeb'.

## Xeel P'ak'b'il seb' sek'

Xeelil xpoqs tzekeem ut xeelil wank chiru pak'b'il seb' sek' mare wank lix manteekileb' li xul ut awimq, xeelil awimq, reetalil manteek re chiqok. Hoon naru naqoxtzol lix xeelil pak'b'il seb' sek' rik'in lix tzekeeme ut li jal jalank ru chiqokeb' li najter poyanam.

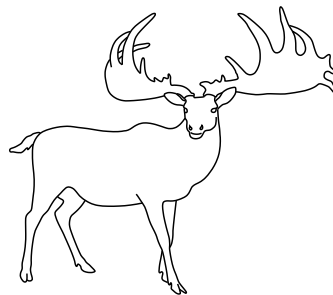
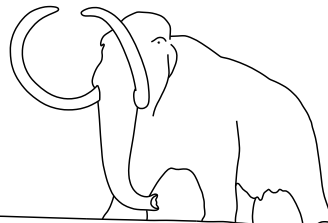
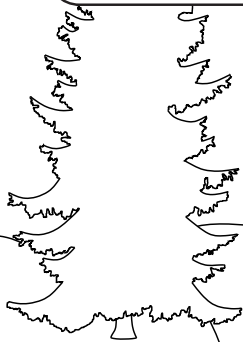
## K'ARU YOOKAJ TZOLOM

Laj tzoloneleb' chirix resilal na'ajej yokeb' roqsinkil li ak'na'leb' ut xch'iich'il re tzilok patz'om chirix xwanko'jik li poyanameb' sa' junxil kutank. Rik'in tz'akal ch'olch'oo k'anjelob'aal, nab'al esilal hoon naru qatzol ut rik'in ch'inaj reetalil kama' lix b'aqel, ruux e ut pak'b'il sek'.



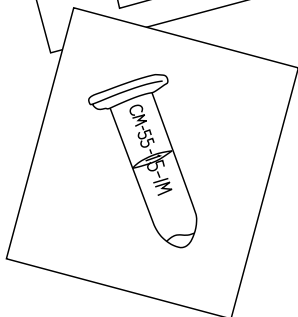
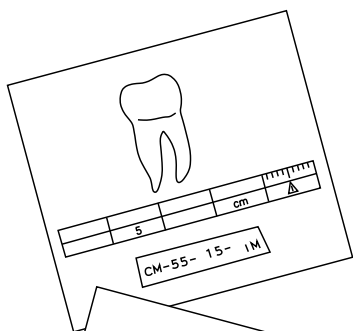
## MANAKNAW?

40,000 hab' sachik li Neanderthals, a' b'anan lix ralal xk'ajol xe'toon tyo'tyoo rik'ineb' li poyanam ink'a' African.



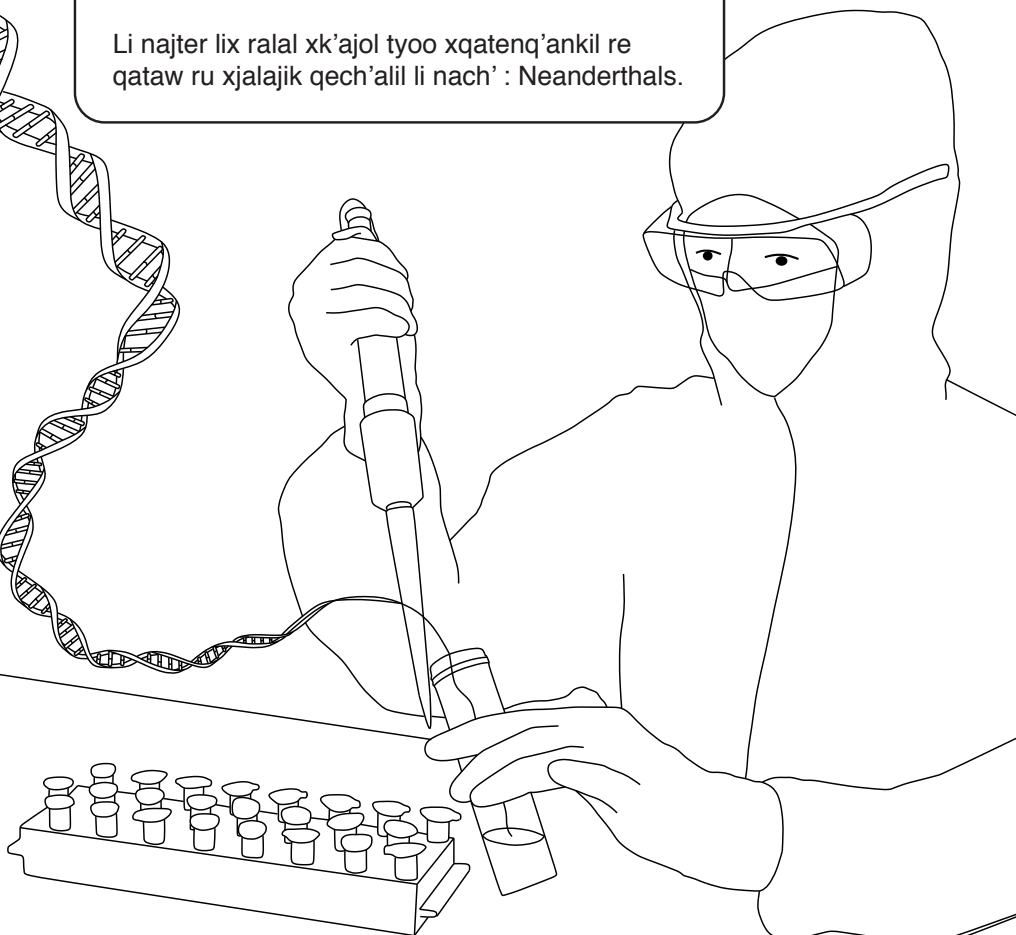
## LIX XE' POYANAM

Li najter lix ralal xk'ajol tyoo xqatenq'ankil re qataw ru xjalajik qech'alil li nach' : Neanderthals.



## Jalajik

Rik'in tzolok ruux e ut b'aq reheb' najter poyanam, hoon naqataw chank xe' wank qa xe'toon, chank naq la'oo li poyanam lix ralal xk'ajol xe'toon sa' li kuntan anawank.



# NAJTER Q'AXONK

Li najter xreetalil xralal xk'ajol ki siq'mank rik'in b'aq ut ruuch e naru re xyeeb'ankil resilal q'axonk sa' junxil kuntank. Naq qi junajink li resilal rik'in tz'ilb'il na'leb', ha'aneb' lix ch'uyal, xeel, poqtz natawmanq rik'in yo'yoqil xul, li q'axonk ha'in natawmanq reetalil sa' xhonal ut na'ajej.



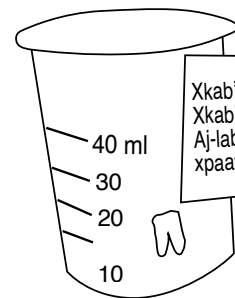
Scythians, Central Asia  
Sa' li najter kutanq numenaqchaq, setecientos xchihab' BC-(ha'an kiwanq sa' ruchichoch; naq toj maji'aq li kristo.)

# MANKANAW?

Ha'aneb' lix ch'uyal, xeel ut li poqtz natawmanq rik'in yo'yoqil xul, ha'in ink'a' kaw ru, lix tzekeem le awimq nataw sa' iq' naq xtaw lix qwa'leb'aal rik'in saq'e ut sa' ha'. Li xuleb' nax k'ulaj sa' chib'el lix xeeleb' li tzekeem naq neqe' xwqa' li awimq. Lix sib'j/sib'jel na ch'och'o' naq ki najter xnumik li kutanq. Naq xe' xp'is li harub' lix sib'jel(14C) natawmanq sa' reetalil najter xeel, naru nayeemank harub' xnajtil li ki yo'yo li xul.



Eetalil lix ch'uyal, xeel ut li poqtz natawmanq rik'in yo'yoqil xul



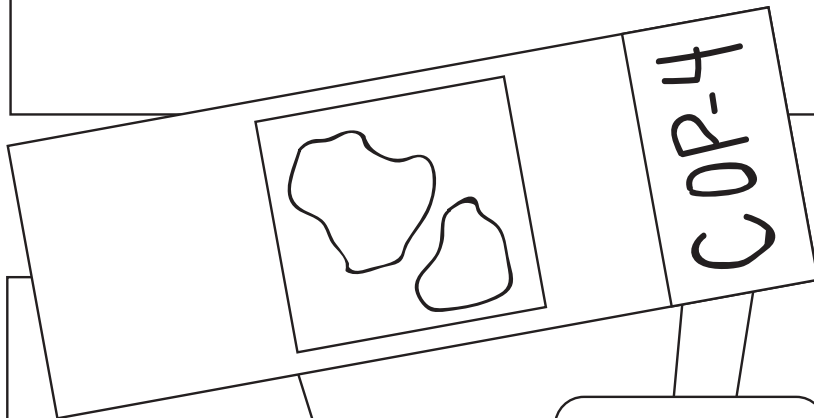
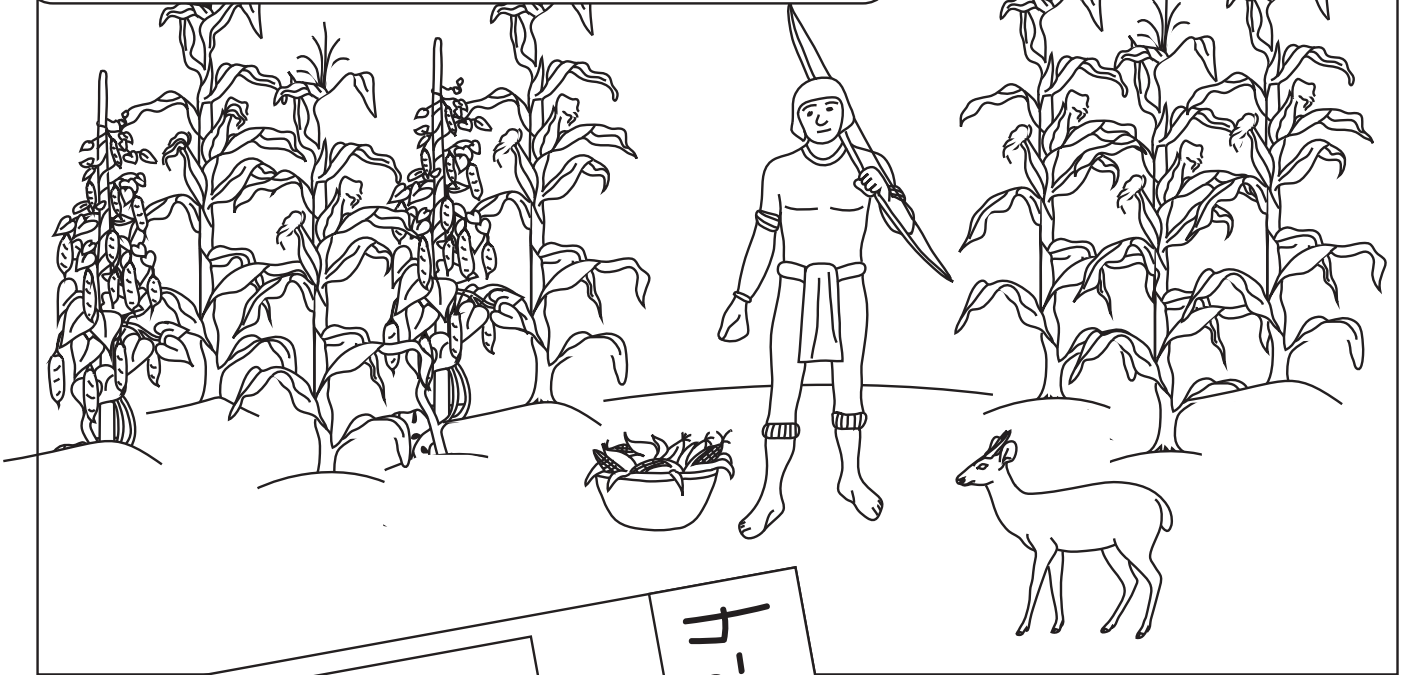
Xkab'a'ej eetalil:  
Xkab'a' ak'arjel:  
Aj-lab'aal kutanq re xpaayil ru reetalil:

Li reetalil lix ch'uyal, xeel ut li poqtz natawmanq rik'in yo'yoqil xul jun reetalil hoon na oksimank re xtabw'al xhab'al li xuleb' ut awimq toj re cuarenta mil xihab' nawanko'.

# LI NAJTER TZEKEEME

La tzoloneleb', neqe' roqsi li lem re rilb'al li kok' xeel tzekeeme chiru najter uk'al ut ruuxi e poyenam. Li resilal li kok' xeel awimq ut li xuleb natawmanq sa' pek , xotz'ol rik'in esilal najter tzekeem aneqe' xwqa' li najter xe'toon sa Mesamerica kwib' mil xihab' xnumik.

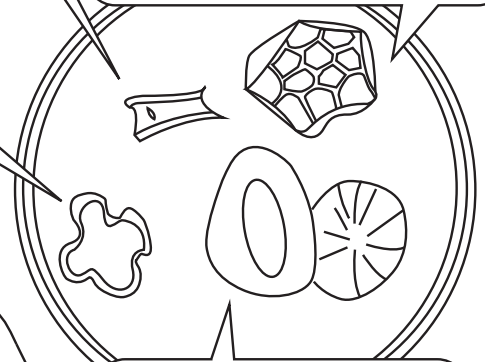
Copan, Honduras  
Reetalil xwanqo'hikeb' li  
aralch'och', AD- sa' xhaab'il  
xyo'laj li kristo, 300



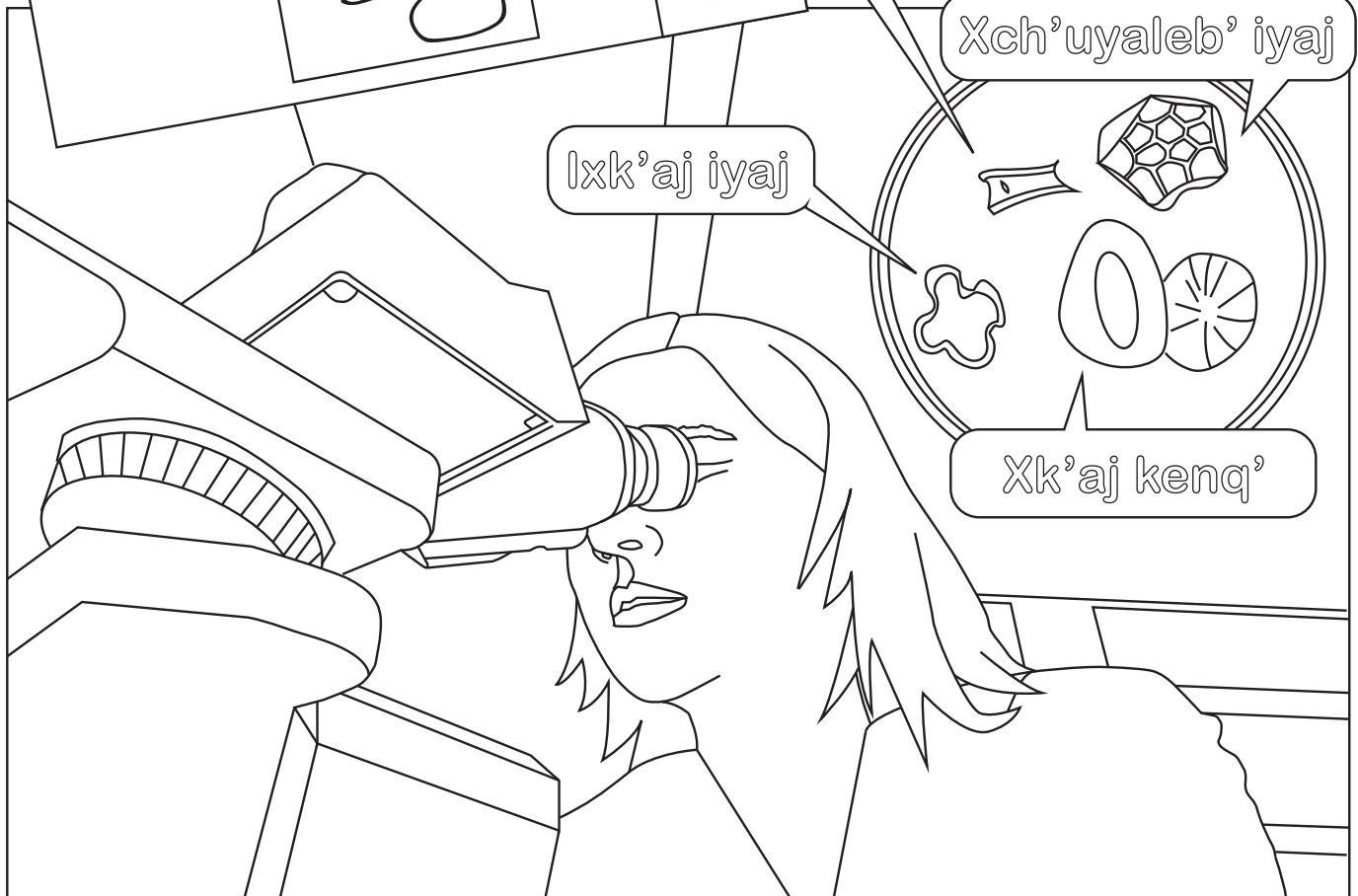
Xeelil/ch'uyal ixim  
sa' pek

Xch'uyaleb' iyaj

Ixk'aj iyaj



Xk'aj kenq'

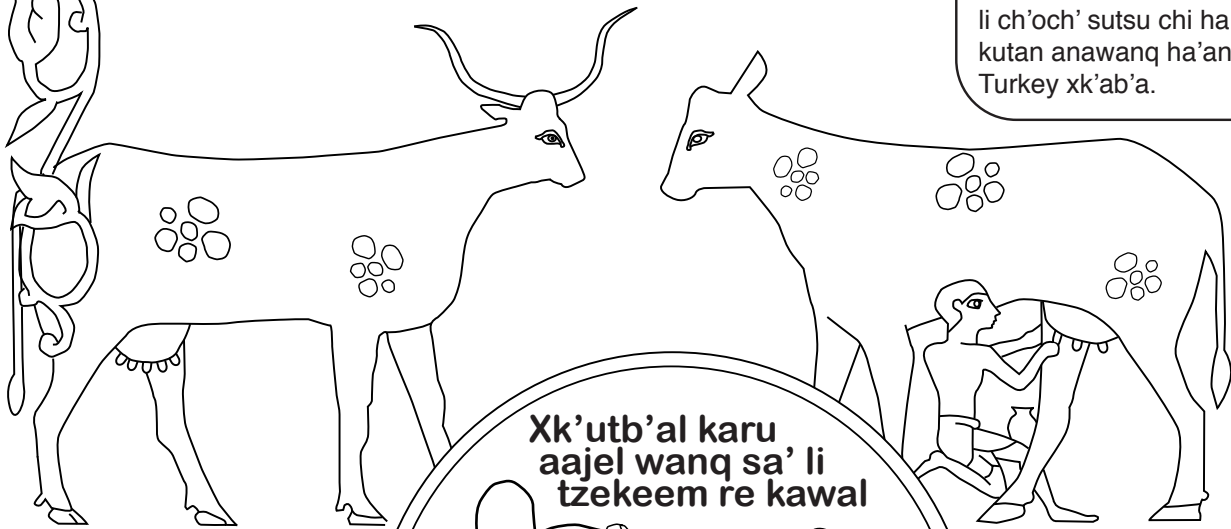


## XK'ANJELANKIL

Numenaq diez mil chib', ha'aneb' li poyanam sik' b'ilru reetalil yo'keb' xk'iresinkileb' li awimq ut li xuleb'. Li wakax ha'an xb'eeneb' li xul xk'iresi choqre tzekeem, ut xb'eeneb' li poyanam neqe' roksi re k'amleb'/b'ehleb'aal ch'iich', chib', leech ut tz'uumal re chunleb'aal.

## MANAKANAW?

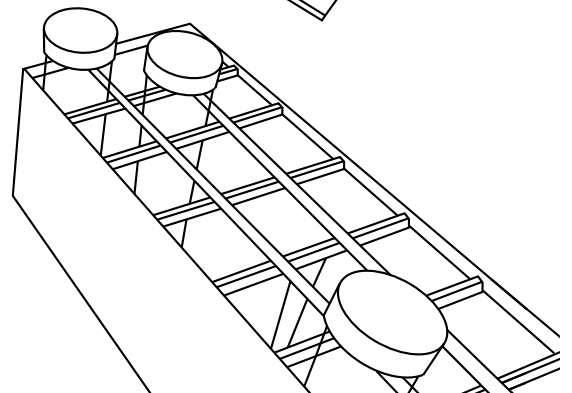
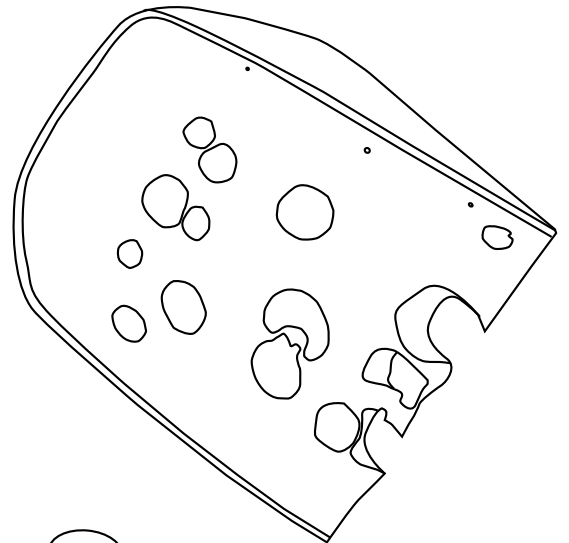
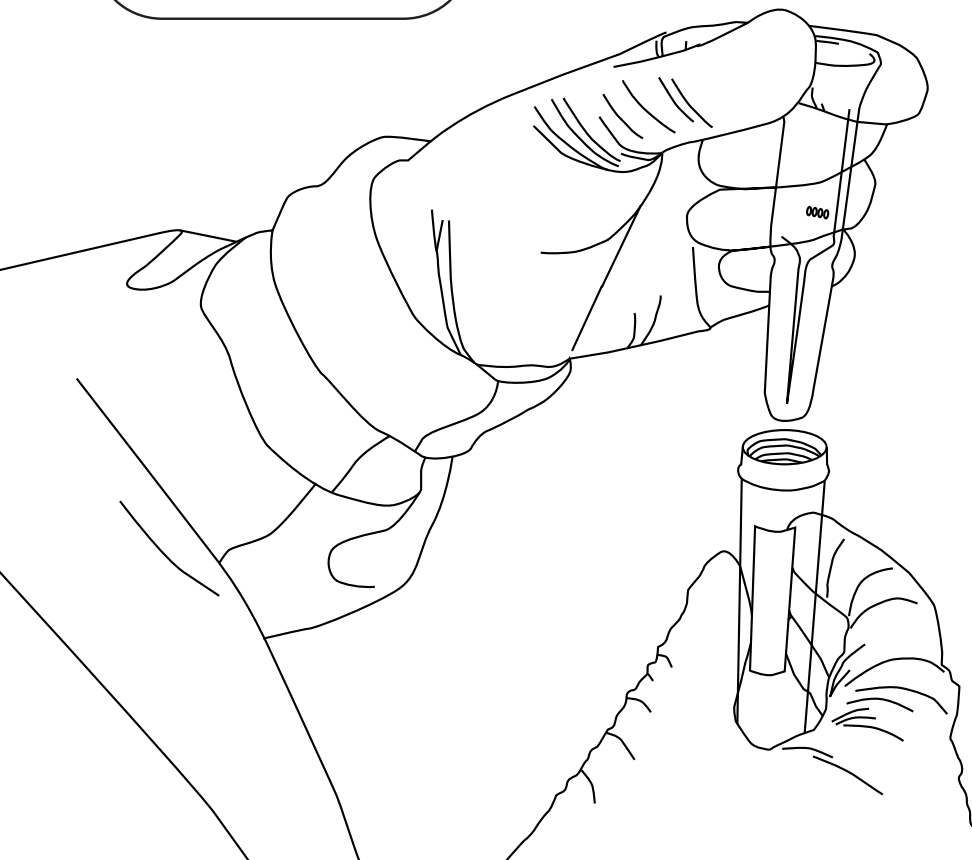
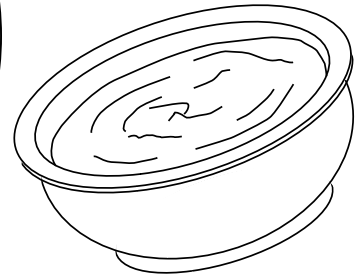
Cattle were domesticated Li wakax kikiresi rik'in li xul (Aurochs)xk'ab'a, jun nimlaj k'iche' xul xkomoneb' kej ut anawanq xe' sach. Lix xb'een reetalil li kiresinb'il wakax aran ki chal sa' li tenamit Anatolia, li ch'och' sutsu chi ha', ut sa' li kutan anawanq ha'an li tenamit Turkey xk'ab'a.



Xk'utb'al karu  
aajel wanq sa' li  
tzekeem re kawal

## Xchiklajik li leech

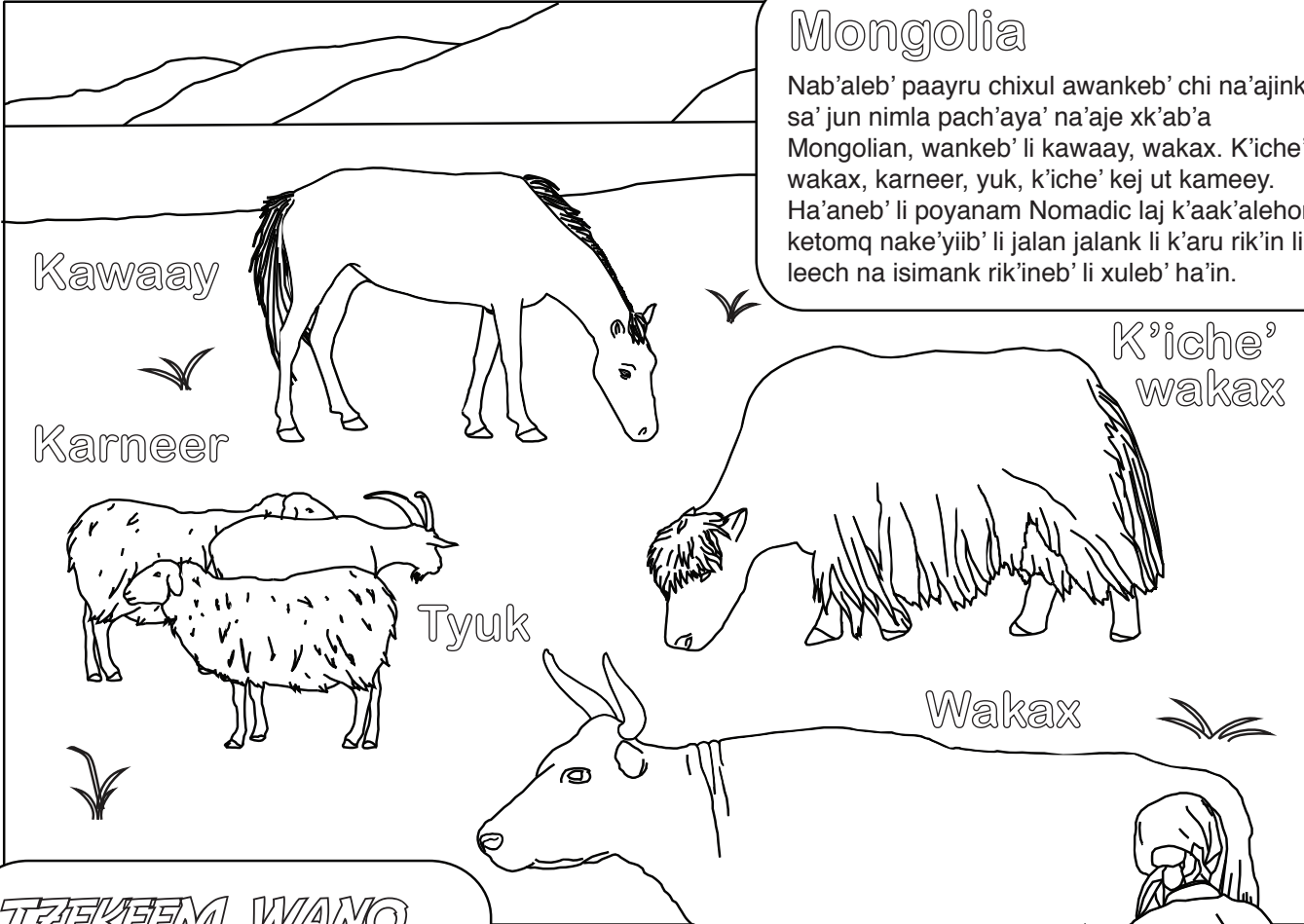
Ink'a xnawmank lix chiklajik li leech, uteb' la tzolone! chirix junxil na'ajej yokeb' roksinkil xb'aanunkil re xtawb'al li leech sa xp'isb'al chi junpuuk reetalil sa' li najter ruuch e ut xyiib'ankil chanru kiwanq esilal rik'in xyiib'ankil li leech.





# Mongolia

Nab'aleb' paayru chixul awankeb' chi na'ajink sa' jun nimla pach'aya' na'aje xk'ab'a Mongolian, wankeb' li kawaay, wakax. K'iche' wakax, karneer, yuk, k'iche' kej ut kameey. Ha'aneb' li poyanam Nomadic laj k'aak'alehom ketomq nake'yiib' li jalan jalank li k'aru rik'in li leech na isimank rik'ineb' li xuleb' ha'in.



Kawaay

Karneer

Tyuk

K'iche' wakax

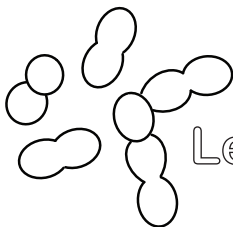
Wakax

## TZEKEEM WANQ LIX LEECHIL

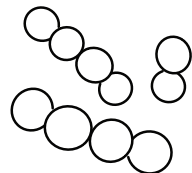
Sa' li tenamit Mongolia, aajel naq wank li tzekeem wank lix leechil sa,rajlal kutan. Rik'in li tz'ilok na'leb' chirix junxil na'ajej, xkanaw naq ha'in li najter b'aanuheem, natawlimank naq oxib'mil rik'in joob' cien chihab' xnumik chikan.



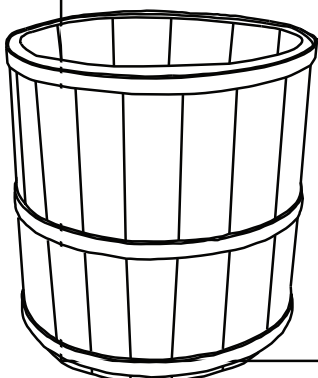
Staphylococcus



Leuconostoc

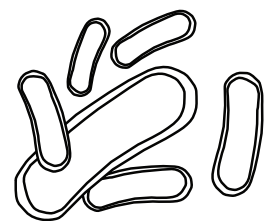


Lactococcus



## Lix kok' xulil li leech

Lix kok' xulil li leech- q'axal aajel lix mo' il ut tz'ub'il- tento wank re yiib'ankil li nab'al paayru li tzekeem wanq lix leechil, yoghurt-jun tzekeem ch'am xk'uxb'al, mantekiiy ut kees, ut wank ink'a' xnowmank li tzekeem, kama' Mongolian aaruul-leech na yiib'a naq ki ch'amo' ut wan xwoqx sa'xb'een, ut rik'in airag-serwees -yiib'anb'il rik'in tz'ab'il ru leechil xtu kawaay.



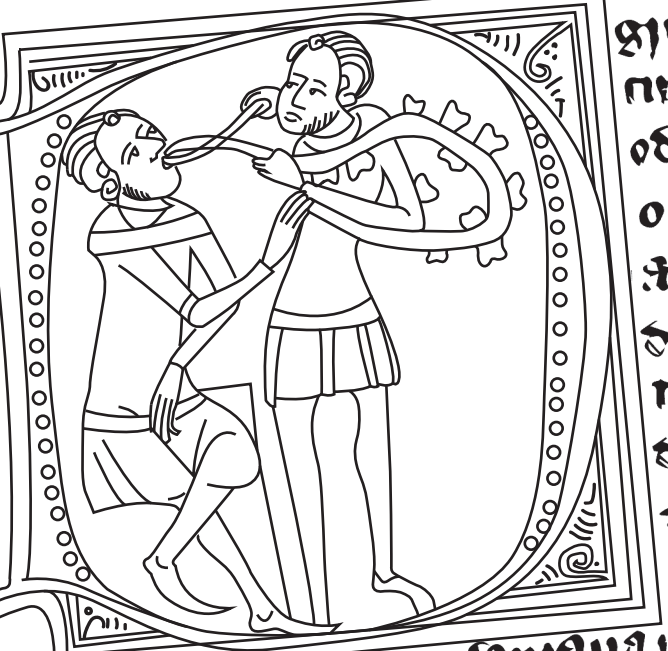
Lactobacillus

am hlania...  
Secantare: qm tonim  
Aut Acidia

# NAJTER YAJEL

Li b'aqeb', ruuch e ut pach'il ha' chiru e, na k'uulaj aajel na'leb' ut esil rik'in xkawilaleb' li poyanam sa' li kutan xnume'chak. Rik'in xreetail, xralal xk'ajol ut tzekeeme kuulanb'il sa' xpach'il ha chiru e kixtemq'ahab' atzolongeb' re textawru li na'leb' rik'in yajel sa' e ut e na q'aak.

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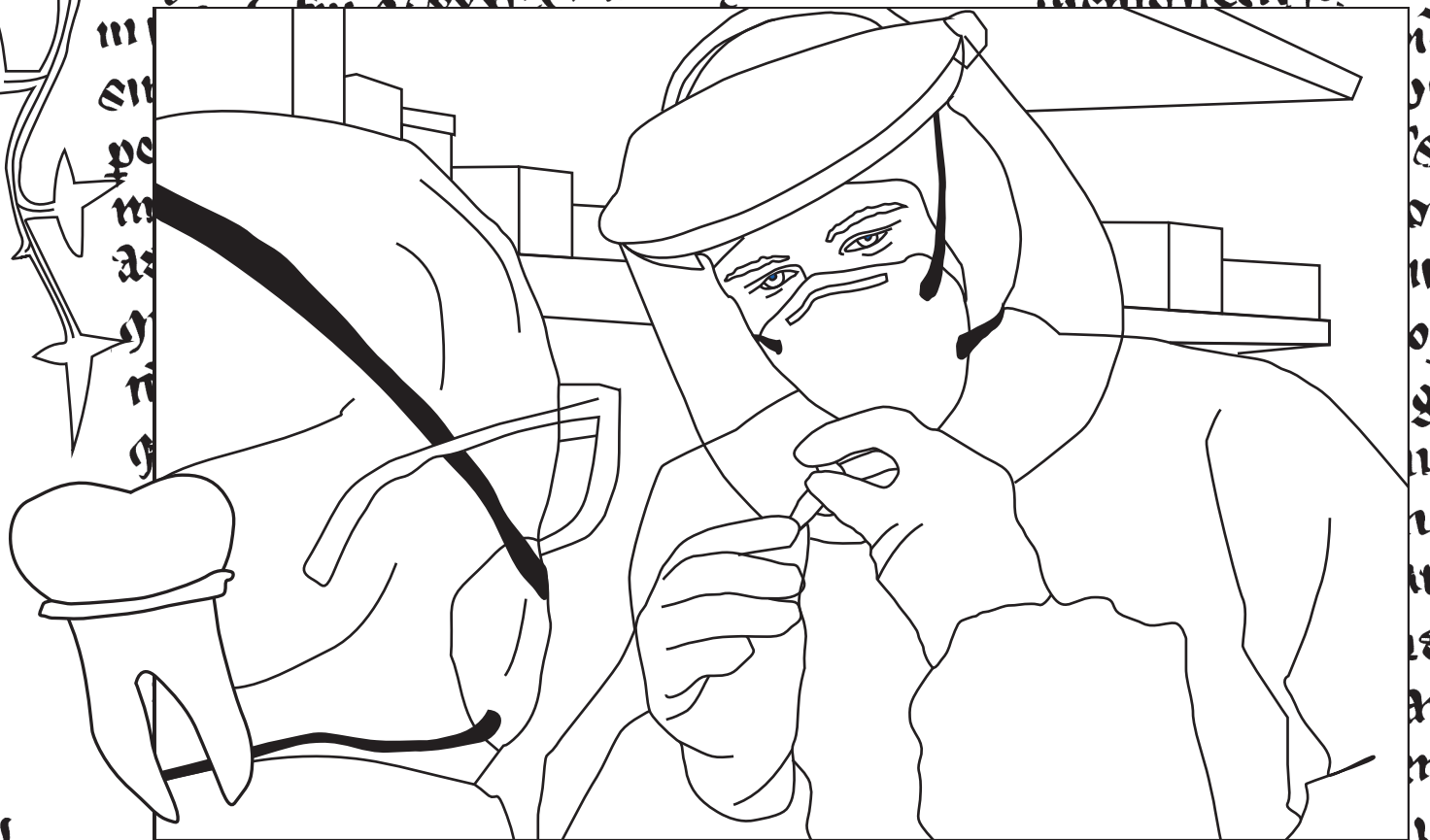


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**Omne Bonum**  
Li Omne Bonum ha'an jun hu xk'ab'a encyclopedia wanq kaalaju cien chihab', aran natawmank resil li yu'am sa' European Middle Ages ut aran wanq sa' ochochil hu re British. Wankeb' xtz'iib'ahomeb' rik'in ilok e ut li lix b'anol ha'an natenq'ank qe re xtawb'al xyaalal li kawilal najter ut yajel.

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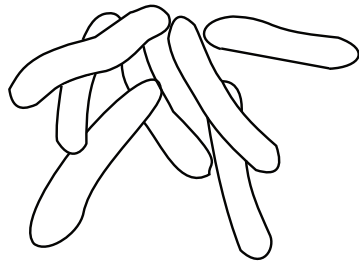
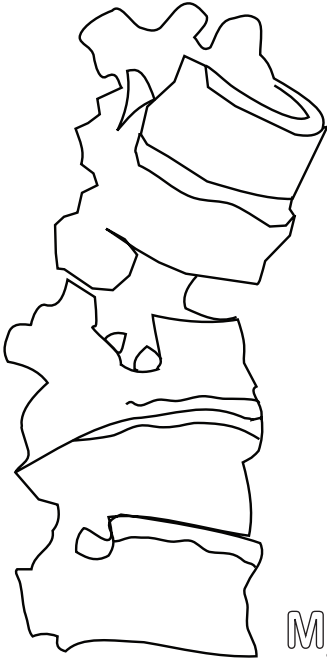


quod priores p'priet' m...  
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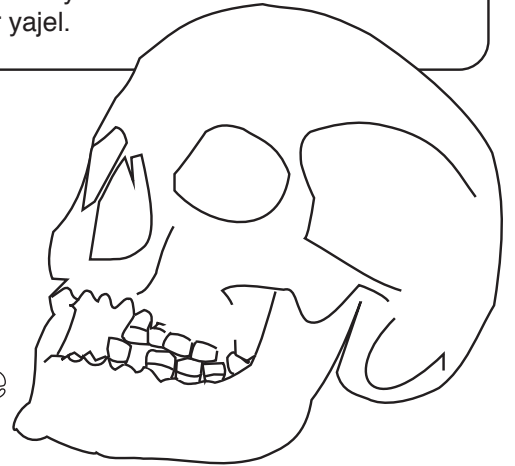
tantis. m' p'ula  
a dulcora sup me

## YAJEL NAXB'ON RIB SA' POSPO'AY RIK'IN YAJEL TZ'UUMALE

Lix yajel pospo'oy ut tz'uumale ha'ineb' li kok'xul xb'aanu: Mycobacterium tuberculosis and Mycobacterium leprae. Xkab'ichal nax b'on li b'aq, ut reetalil lix xe'xralal xk'ajol xkanab' sa' b'aqel rik'in yookeb' laj tzolonel yib'ankil li esil chirix najter yajel.

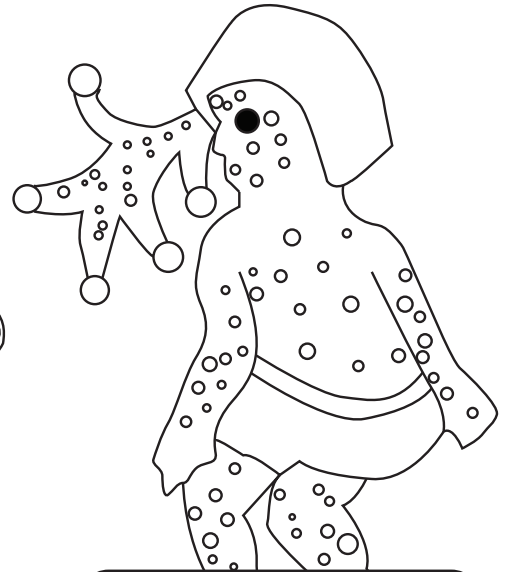


Mycobacterium leprae

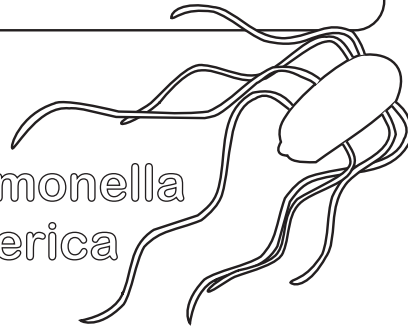


## COCOLIZTLI

Jun nimla rahilal ink'a x nawmank- xk'ab' cocoliztli k'eeb'il xb'aaneb' li poyanam Aztecs- xkamsiheeb'60-90% xtenamitleb' li poyanam sa' Mexico sa' chihab' AD 1545 rik'in 1550. Toje' xtaumank lix xe'n lix xulel Salmonella enterica Paratyphi tawmank sa ruuch e likix k'uleb' nimla rahilal.

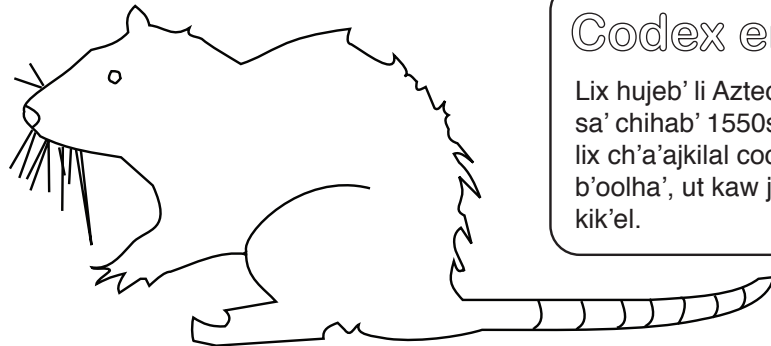


Salmonella enterica



## Dr. Schnabel

Laj b'anonel yookeb' xb'aneb'al lix xk'uleb' li nimla yajel sa' wuqlaju cien chihab' xk'ejeb' lix k'oj kama' li tz'ik na ilok re te' xkolrib'eb chiru li maa'us iq'.

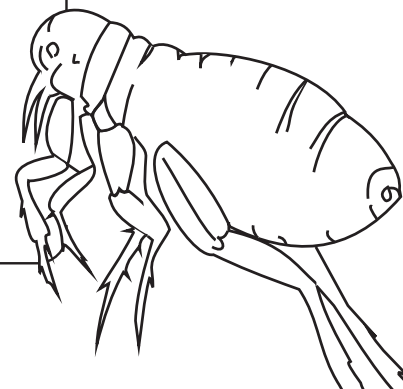


## Codex en Cruz

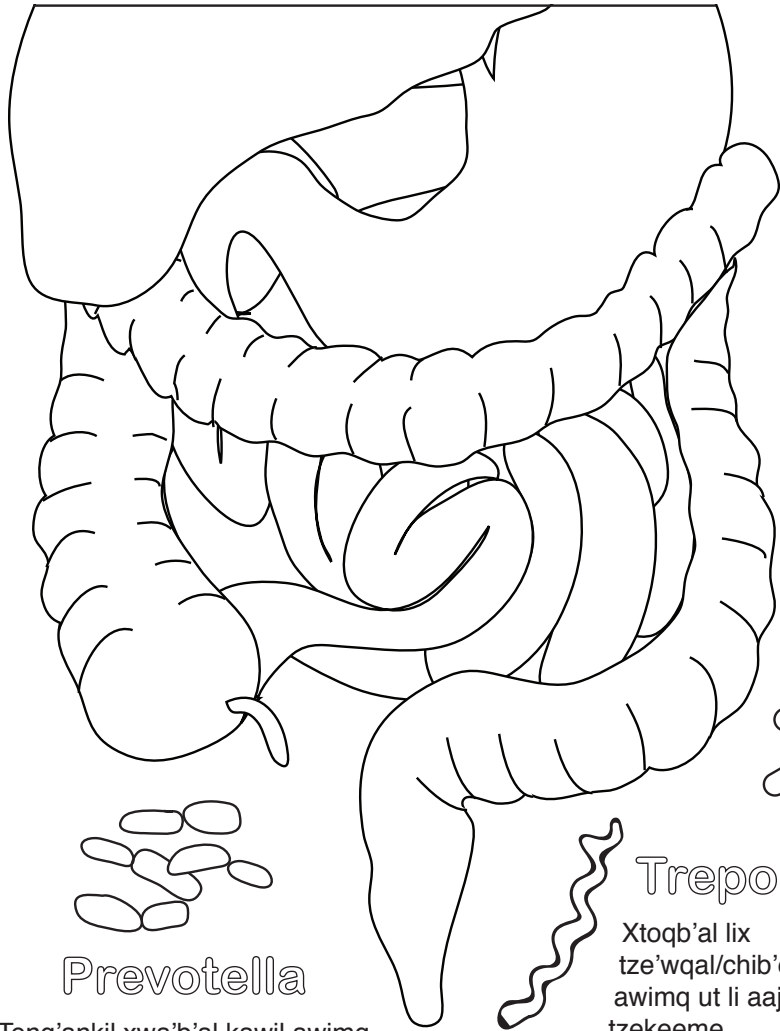
Lix hujeb' li Aztec tz'ib'aneb'il sa' chihab' 1550s xk'utb'esi lix ch'a'ajkilal cocoliztli: chiq, b'oolha', ut kaw jwal na el li kik'el.

## NIMLA RAHTLAL

Li nimla rahilal ha'an xb'aanumank xb'aan li kok' xul xk'ab'a Yersinia pestis, ha'in tpuksesimanq li k'aq b'onol aneque wank xb'een li ch'ooh. Li poyanam aneque k'uxe' xb'aan li q'ak, xyoob' li nimla yajel bubonic. Numtejenaq li kamsink kixb'aanu sa' chihab' (AD 1346-1353) ha'an hunhachal li poyanam xkamsi sa' li tenamit Europe.







### Helicobacter pylori

Aran nawank sa' li xsa'e ut nax chiqib' li yajel xox ut siipilal xk'ab'a cancer

### Bifidobacterium

Tenq'ank re xwa'b'al/ xkub'sinkil xtzekeem leech li k'uula'al.

### Faecalibacterium

Nax yiiib' lix tzekeeme re chib'el li k'amk'ot.

### Prevotella

Tenq'ankil xwa'b'al kawil awimq

### Treponema

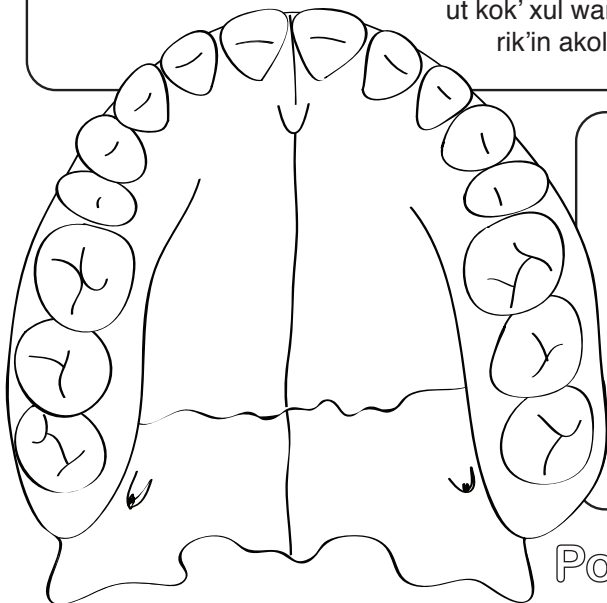
Xtoqb'al lix tze'wqal/chib'el awimq ut li aajel tzekeeme

## LIX KOK' XULIL XE'TOONIL

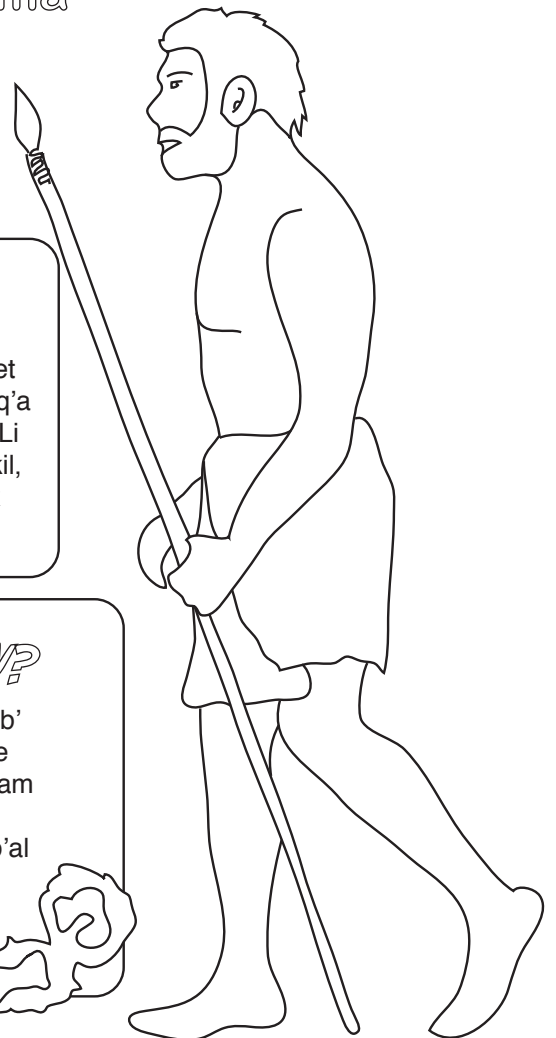
Ajunixakalil ha'an lix ochochil re xk'ihal xtze'wqal kok' xul , ut juntaq'eet xk'ab'a microbiome. Li kok' xuleb'awankeb' sa'laj k'amk'ot nakat xtenq'a re xkwa'b'al la tzekeem ut xkawresinkil lix kolb'al awib'sa'ajunixakalil. Li kok' xuleb' ha'in natawmank chiru tz'uumal natenq'ank re la sab'esinkil, ut kok' xul wanq sa' awe natenq'ank rik'in akolb'al rik'in yajel.

## MANAKANAW?

La tzoloneleb' yookeb' xtz'ilb'al rix li ruuchi e ut xk'ot najter poyanam re tawmank lix xe' li Microbiome ut xtawb'al ru lixb'aanuhom li yajel.



### Porphyromonas



## SIK'OK- YOHOB'K

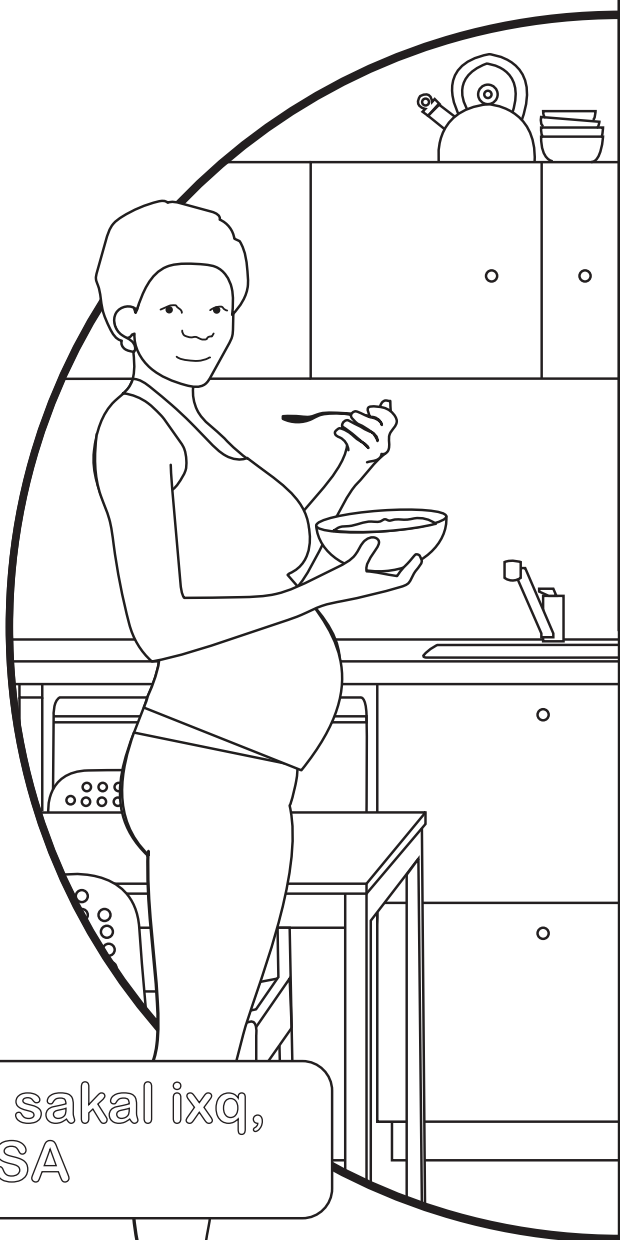
Li naj Sik'ok, - li na ye'mank re la yohob'k-molok, na wqa' k'iche' tzekeeme, ut li tzekeem ak xq'ehil/xkutankil natawmank jalan jalank paayru.

Na tojmaji' xchiklajik li k'alib'q sa' chak diez mil chihab' xnumik, chixjunil li poyanam sa' ruchich'och' yal naqe' siq'ok chak' tzekeeme.

La sik'ol tzekeeme anawanq nab'al paay ru lix xulil li k'amk'ot Microbiome chiruheb' li wankeb' sa' nimla tenamit.



Li qana'chin  
Hadza ut li  
k'uula'al,  
Tanzania



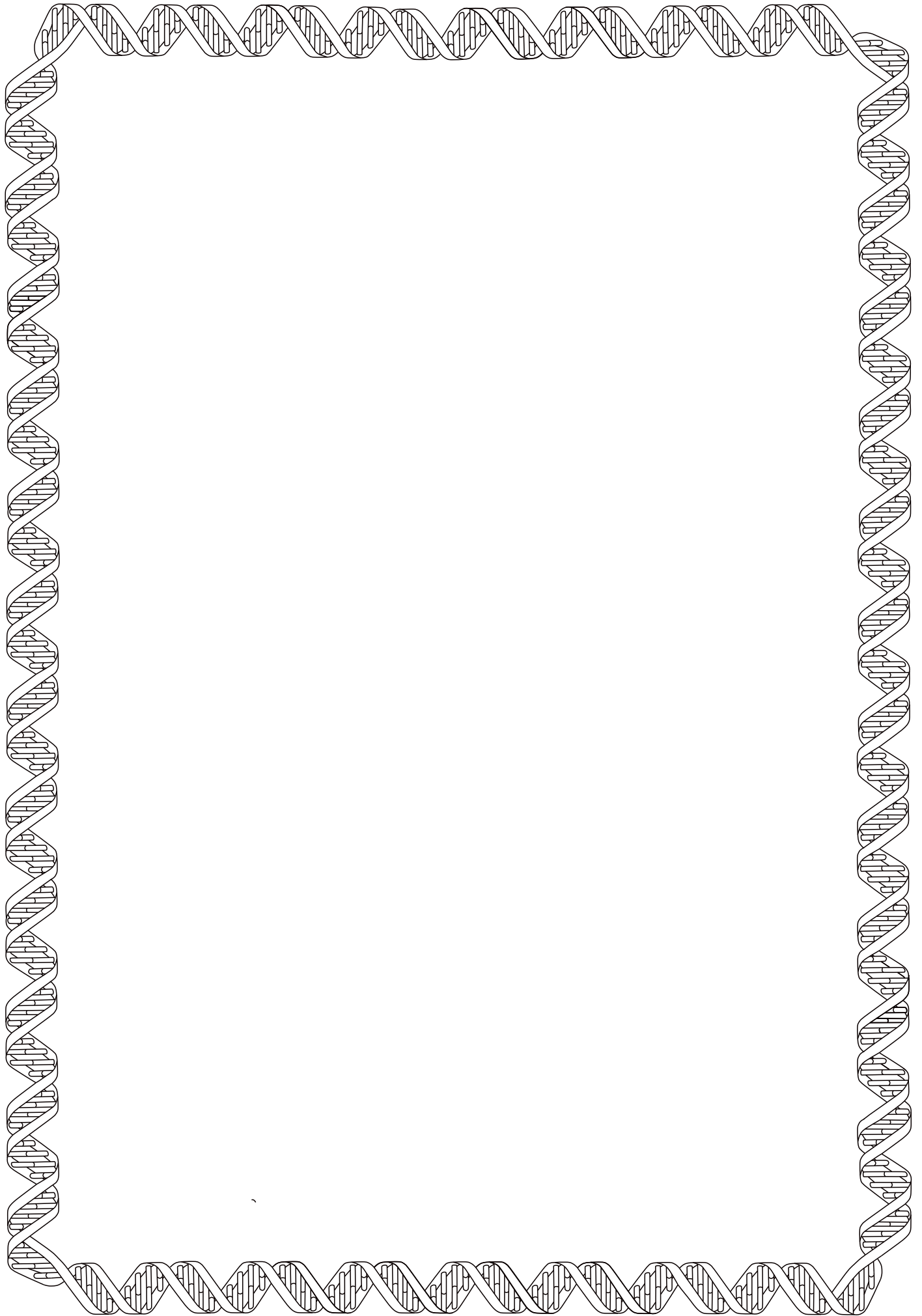
Li sakal ixq,  
USA

## INDUSTRIALIZED SOCIETIES

Li ak'il tenamit anaqwan lix qwa'leb'aaleb ha'an li awb'il tzekeem, ut xtyiib'ank'il li tzekeem, ink'a' k'l neqe' k'anjelank re.

K'anjelob'aal rik'in ch'iich', xk'uulankil ut k'uuleb'aal ha'an lix reetalil li tyiib'amb'il tzekeem, ut li tzekeem najt kichal toja' ut na qwa'e.

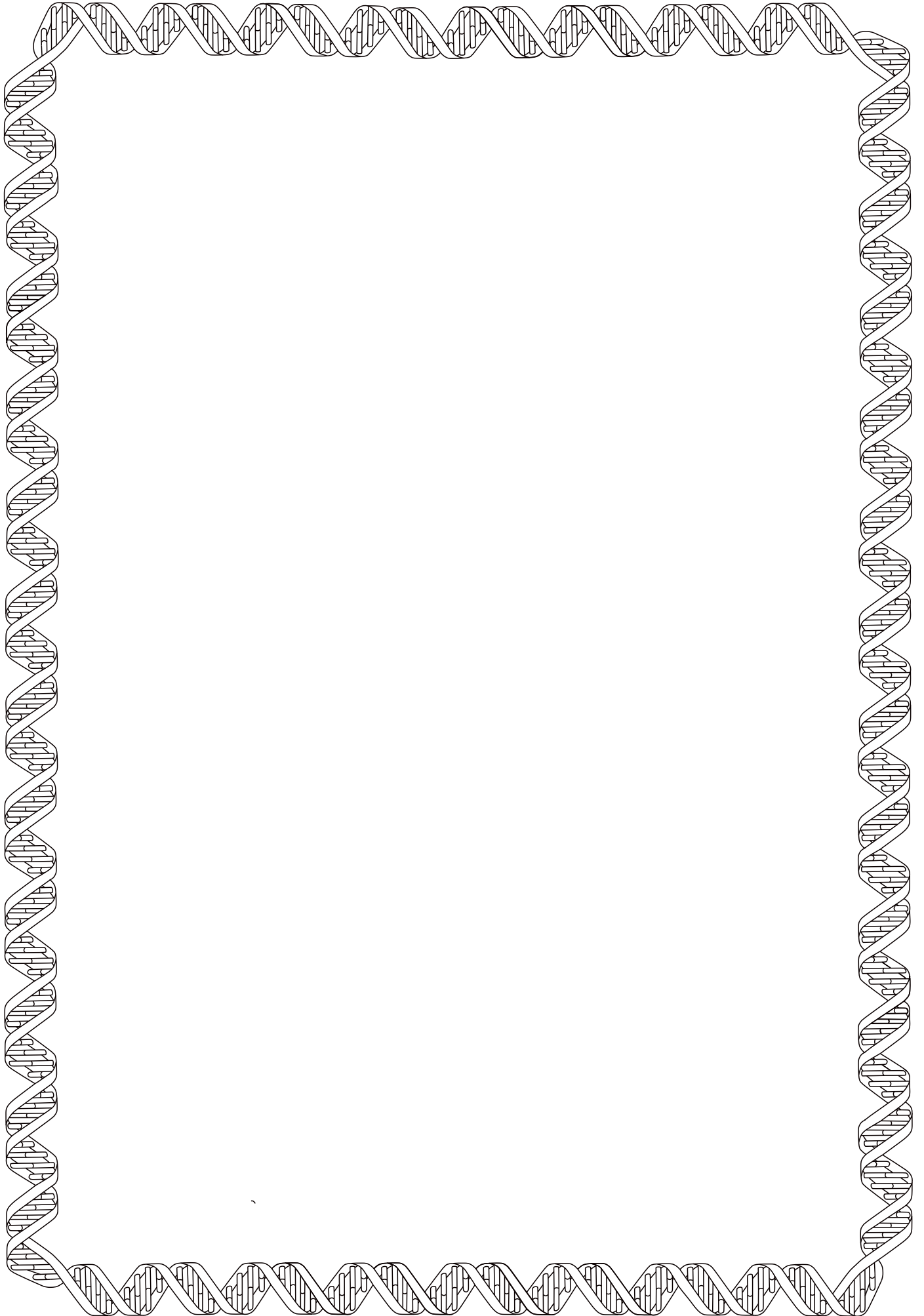
Li poyanam wankeb' sa' ak'il tenamit sa' akutan anawank, muku k'l xpaay ru li microbiomes sa' li k'amk'ot, xiwajel choqreheb' rik'in nimla yajel.





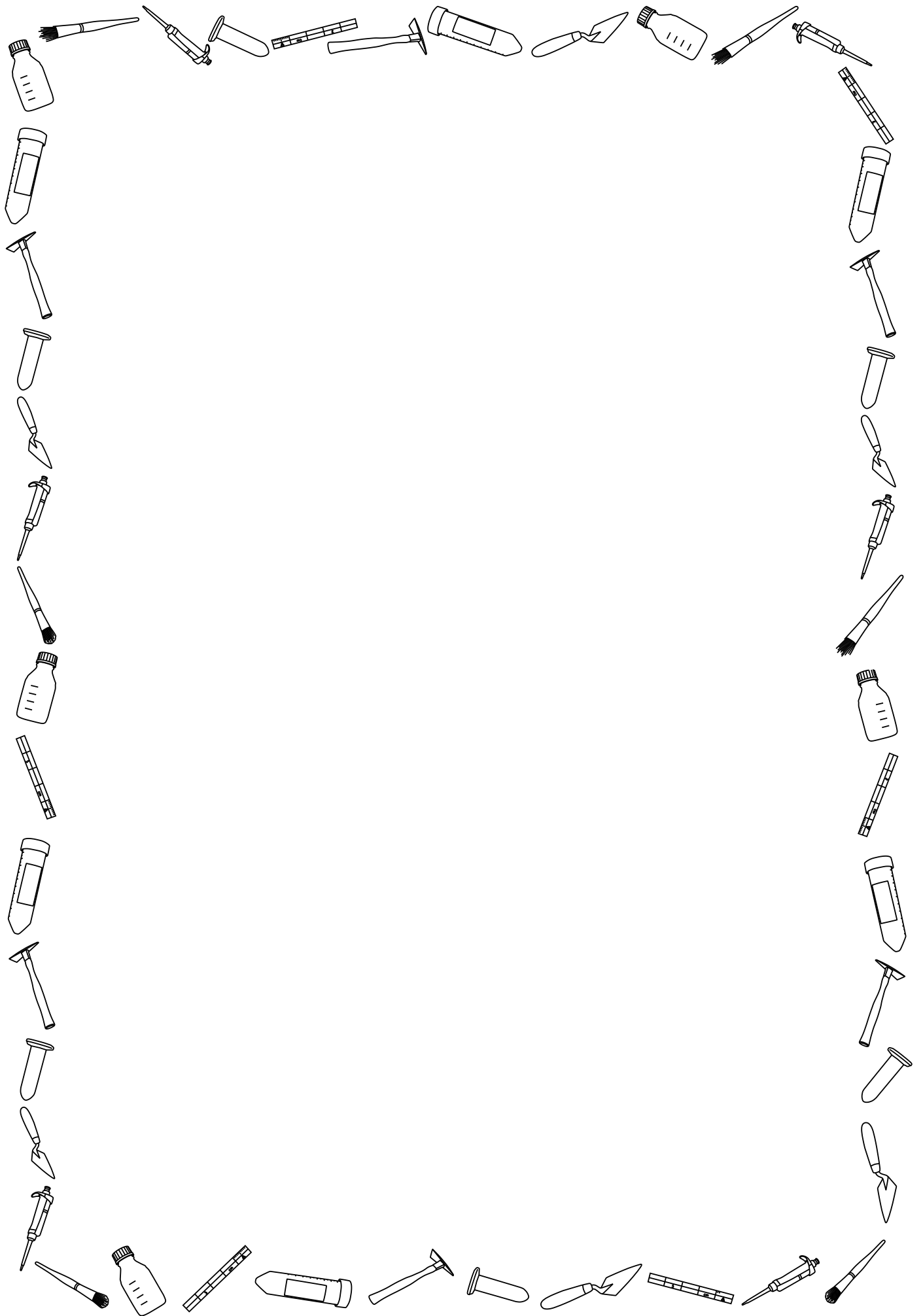




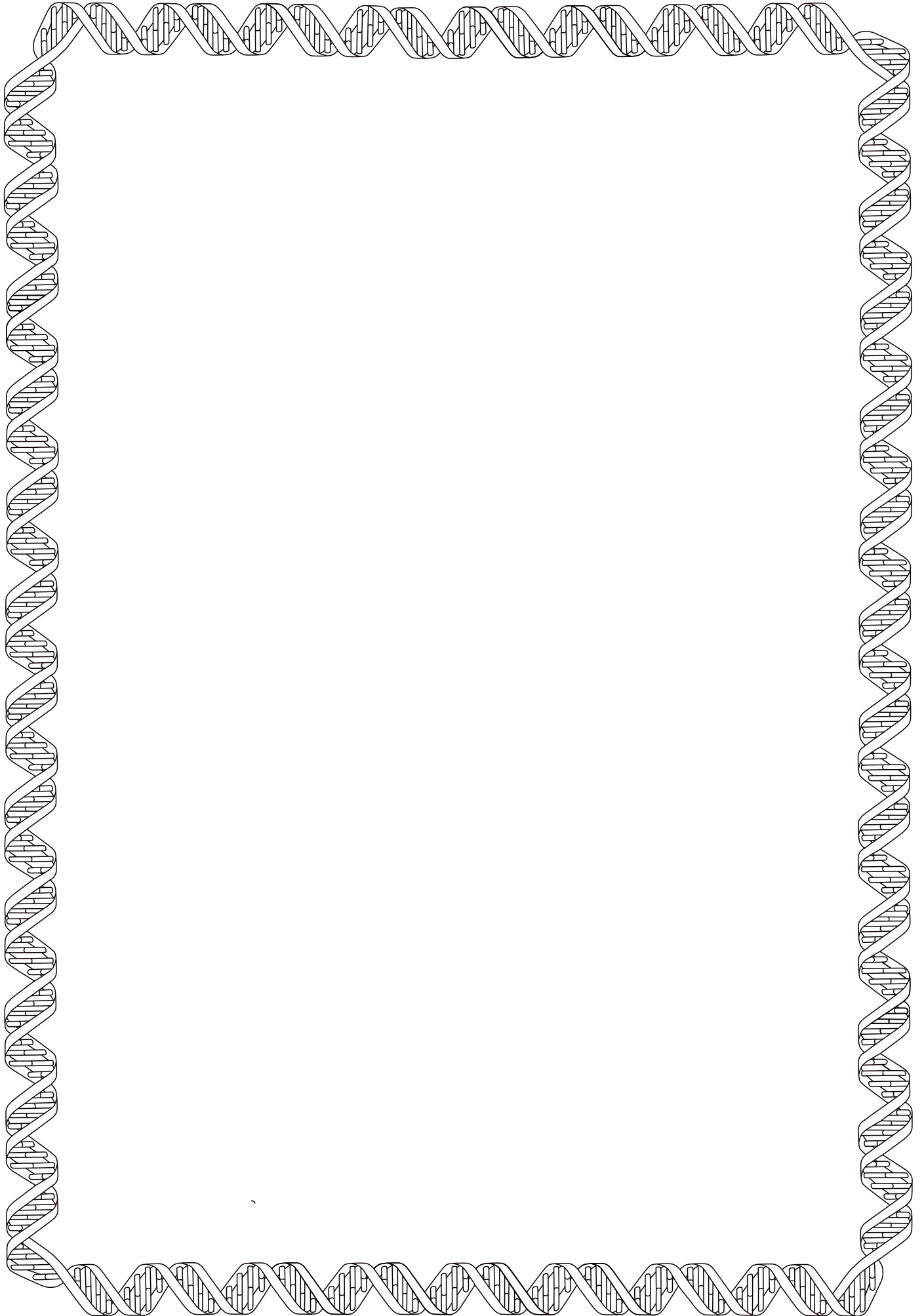






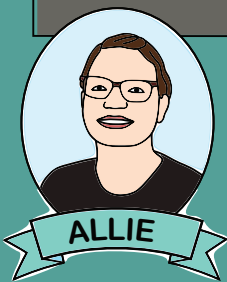




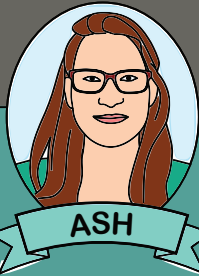




# Max Planck Institute for Evolutionary Anthropology



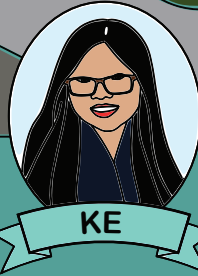
ALLIE



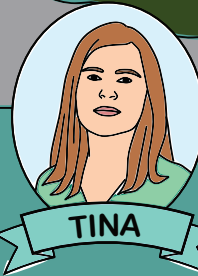
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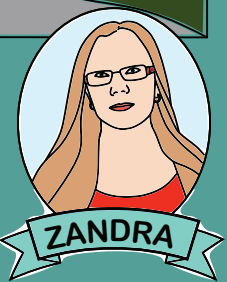
JESSIE



KE



TINA



ZANDRA

## B'eenik sa'

# TZOLOLEB'AAL CHIREX JUNXIL NA'AJEJ

## Hu re b'onoq

Tzolon chirixeb' aj pikonel ut atzolonel yokeb' chik'anjelak re xsumenkil la patz'om chirix junxil poyanam. Taqwochb'enijo re xch'olb'al ru anijo ut karu yoo qatzolom, rik'in xchiklajik li poyanam tojrik'in najter nimla yajel.tzolon rek'in li najter k'axonk ut tzilb'al na'leb' rik'in xeelil k'a'. tat ilok chanru atzolonel xtyiib' li najter tzekeem rik'in xk'ok xeel awimq na ilmanq rik'in lem. Sik'omak chanru li k'iresink sa' b'atzunk li yaal/ch'olch'o ru ut li tz'ilb'il na'leb' chirix li tzekeem wank lix leech sa'. Tawomak li najter xe' re li yajel ut nimla yajel ut taw li microbiome re najter poyanam.

Yiib'anb'il xb'aaneb' laj Tzolonel sa' tzolleb'aal Max Planck chirix xjalajik lix yu'ameb' li poyanam.

Li jaltessinb'il sa' aatinob'aal Q'ekchi' xb'aan:  
Elvia Bo, Jose Mes



ELVIA



JOSE