

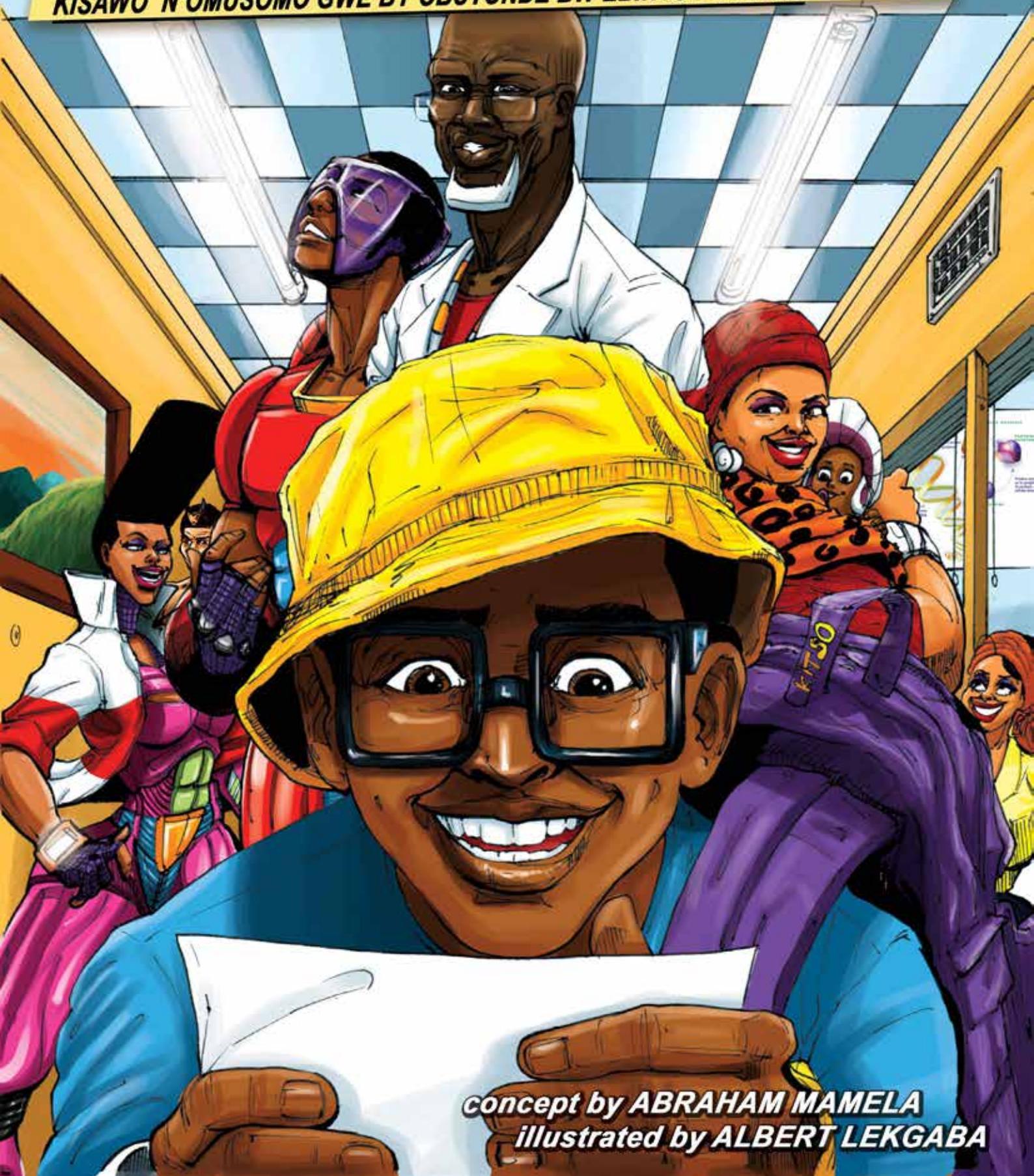
AKATABO 4

GENOME ADVENTURES

ESSUUBI LITANDISE OKULENGERWA:

KASAJJA AYITAAYITA BY'OKUNOO NYEREZA KU BY'EBY'OBULAMU BWE

KISAWO N'OMUSOMO GWE BY'OBUTONDE BW'EBINTU EBIRAMU



*concept by ABRAHAM MAMELA
illustrated by ALBERT LEKGABA*

FOREWORD

The Ministry of Infrastructure, Science and Technology (MIST) has a mandate to provide and maintain building infrastructure, serve as a regulatory body for the use of nuclear technology and to coordinate Research, Science, Technology and Innovation. The key words science, research, technology and innovation define the core vision while consultation and collaboration with stakeholders are critical enablers of its mission. Broadly, MIST's stakeholders include artists and other players in the scientific arena.

The art industry plays a very crucial role in our society. Through art we can challenge our society's deepest assumptions, spark new ideas, inspire critical thought and vision and elicit new actions in society. Imaginations of future cities can come through the inspiration of artists. Through the use of cartoons and comics art can simplify and explain complex scientific concepts, demystify science and thus be a very powerful tool for communication. Therefore, we at MIST view art and artists as important collaborators and enablers of our vision and mission.

I am pleased to note that the Botswana-Baylor Children's Clinical Centre of Excellence (COE) is using art and comics to reach out, engage and educate the community on the complex topic of genes and how they relate to health and disease. In part fulfillment of the goals of the ongoing Collaborative African Genomics Network (CAfGEN) the COE has brought together a team of artists, cartoonists, scientists and journalists to develop a comic book series called Genome Adventures. Funded jointly by Wellcome Trust and the US National Institutes of Health, Genome Adventures is presented in four books. Those in the know will recall that in the first and second books, Kitso, the young hero of the series, with the assistance of several superheroes explored "Heredity and Genetics" and "Cracking the Code," respectively.

The current series of Genome Adventures consists of books three and four. In book three entitled "Decoding Disease" Kitso explores genes and health; and in the fourth entitled "Hope on the Horizon" he explores the intricacies of biomedical and genomics research. Through his amazing adventures Kitso travels the world, experiencing different cultures along the way as he learns about the link between health and genetics. As before, the books are presented in a pictorial and entertaining way using simple language and they can be enjoyed and understood by all. I understand the books will soon be translated into Setswana and several other African languages for greater reach. The Genome Adventures series clearly demonstrates that research and development offer great potential to solving societal problems; and further that even difficult scientific concepts can be communicated to all using comics. At MIST we salute all those involved in creating Genome Adventures. I wholeheartedly endorse this pioneering effort and urge those concerned to consider turning the books into a digital format.



Nonofo E. Molefhi
Minister for Infrastructure, Science and Technology

In and Skills Development

KITSO

DR. MABOKO

KGOSIGADI



MULI MUTYAI NZE KASAJJA.
MBEERA WANDEGEYA NE SSENGA.
NJAGALA NNYO EBY'OKUVUMBULAI
NNAZAALIBWA N'AKAWUKA
AKALEETA MUKENENYA NAYE EKYO
TEKINVUVUBA.

PHODISO

NZE PHILIPPA NAYE
OYINZA OKUMPITA
"SSENGA". BAABA
BWE YAFA YANDEKERA
OMWANA WE
KASAJJA, ERA
KASAJJA, MMWAGALA
NGA BWE NJAGALA
ABAANA BANGE
ABALALAI TUBEERA
FFENNA E
WANDEGEYA, NGA
WAKAVA OTI E
KAMPALA TUYINZA
N'OKUBEERA
BALIRAAWA BO!



NDI MUKYALA ATEEMOTYAMOTYA
ERA OMUKULEMBEZE WA BANTU
BANGE OWA NNAMMADDALA, BA
NNAYUGANDA. NNYINZA
OKUBALABIKIRA NGA
JJAJJAMMWE OWA BULIJJO,
NAYE OMUGGO GWANGE
GWENTAMBUZA GULINA AMAANYI
AG'ENJAWULO AGAAVA MU BA
JJAJJANGEI NGA NKOZESA
AMAANYI GANO, NNYINZA
OKULOGA ENKUBA, OKULAGIRIRA
ENSOLO, N'OKUKOLA
EBYEWUUYSISA EBIRALA.



NZE NKULIRÀ EKIBINJA EKIVUMBUZI
KU BY'OBUTONDE BW'EBIRAMU
(NAKAYONDO ABEERE NGA ABAGAMBA
KII) NNINA OBUSOBOZI OBUSAAMAARZA
OBUMPISA MU BISENGE NE
MBUZAAWO SUKUUTA KANGE WANO
ATE NENKADDIZAAWO ERI. SIKOMA
AWO, MMANYA OMUNTU
BY'ALOWOOZAI

XGAO-TGGAI

NZE KWATA-MU NSAWO [OBA
"KWATA" MU BUFUNZE].
NNENYUMIRIZA OKUBA
OMUMBUTI- ABAMU ABANTU BANGE
BABAYITA BA 'NNAKALANGA' OBA
'BUNNAKALANGA'. ERA NDI MUZIRA
MU BAZIRA MU MAANYI
G'OKUTAMBULIZA ABANTU MU
BISEERA! ERINNYA LYANGE, NGA
TOLIGENZE BUZIBA, LITEGEEZA
'OKULABA OKUSALA NG'AKAGIRITA'
KUBANGA ENDABA YANGE NJOGI
NGA AKAMBE AKOOGI ERA NSOBOLA
N'OKULABA EBY'OMU MAASOI



MARANYANE

MULI MUTYAI NGA
ERINNYA LYANGE,
MAKANIKA, BWE LIRI,
NJAGALA EBY'EMIKONO.
MWEKEBEJJE OMUBIRI
GWANGEI EKITUNDU
EKIMU KYUMA ATE
EKRALA MUNTU. MU
BWONGO NSAZA BUSAZA
ERA NJAGALA OKUKOESA
EBIKOZESEBWA
EBYAKAFULUMAI



MATLI

NZE NNANZIRI. NDI
MUNOONYEREZA! NANGE
NNINA AMAANYI
AG'ENJAWULO AGASOBOLA
OKUTONIYA EBINTU
OKUBITUUSA KU BUNENE
BW'EBIRABIBWA
GAALBINDI
EZIZIMBULUKUSA ZOKKA
NG'OMWO MW'OTWALIDDE
N'ABANTU! NJAGALA
EBYEWUUNYO SSAAYANSI
BY'ATUYAMBA OKUVUBULA
ERA NNANDIYAGADDE
OKULABA ABAWALA
ABATO ABALALA MU
UGANDA NGA BAFUUKA BA
NNASSAAYANSI NGA NZE!





NGOBERERA!

WUUUU.... NAKAYONDO,
KIWLILIKIKA NGA
EBISEERA BY'OBUTITI
BITUUSE. TUKOZESE
AMAANYI GO TUSSEEMU
EBINTU AKABUGUMU.

EEEE? ERINNYA NZE MUKYALA
KALAFI. NDI MUJJANJABI ERA
NINJENDA KUNNYONNYOLA
OKUKKIRIZA NGA OMAZE
OKUTEGEEEZEBWAKYOKKA SOOKA
KATUSOOKETUKUPIME OMUSAWO
BYAJJA OKUKOZESA NGA
AKUKEBERA. ERA NTEEKEKO
N'EKIBUGUMYA EKISENGE..

?

AND I'LL SWITCH
ON THE HEATER.



SWISHHH!!



EKO OKIRABYE
SSENGA!??

YYEE, ENJUBA
YAVUDDEYO,
OLUNAKU NGA
LULUNGI..

NEDDA SSENGA, NAKAYONDO
YE YAKIKOZE NGA AKOZESA
AKAGGO KE AKAFUUSAFUSA.



KAAKATI KASAJJA, ATE N'ERYO
SSI LYE LINNYA LYANGE. KA
TUKITANDIKE KO, TUTANDIKE.

NJNENDA KUKUPIMA OKULABA
OMUTIMA GWO NGA BWE
GUKUBA...

MBALE ENTUNNUNSI ZO
N'EBBUGUMU LY...

ERA NKUPIME OBUZITO
N'OBUWANVU BWO..



BULI KIMU KIRABIKA
KIRUNGI. KAAKATI KA
TWOGERE KU
KUNOONYEREZA...

KA NTANDIKE N'OKUGAMBA
NTI OYINZA OKUVA MU
KUNOONYEREZA ESSAAWA
YONNA. KASSAJJA,
OMANYI BYONNA EBIKWATA
KU KUNOONYEREZA KUNO?

OKUYAMBA ENSI
OKUYIGA AKAWUKA
KA MUKENENYA
N'AKAKAFUBA BWE
BWEYISA. KYEKYO?

TEKKO KITUUFU KITSO.

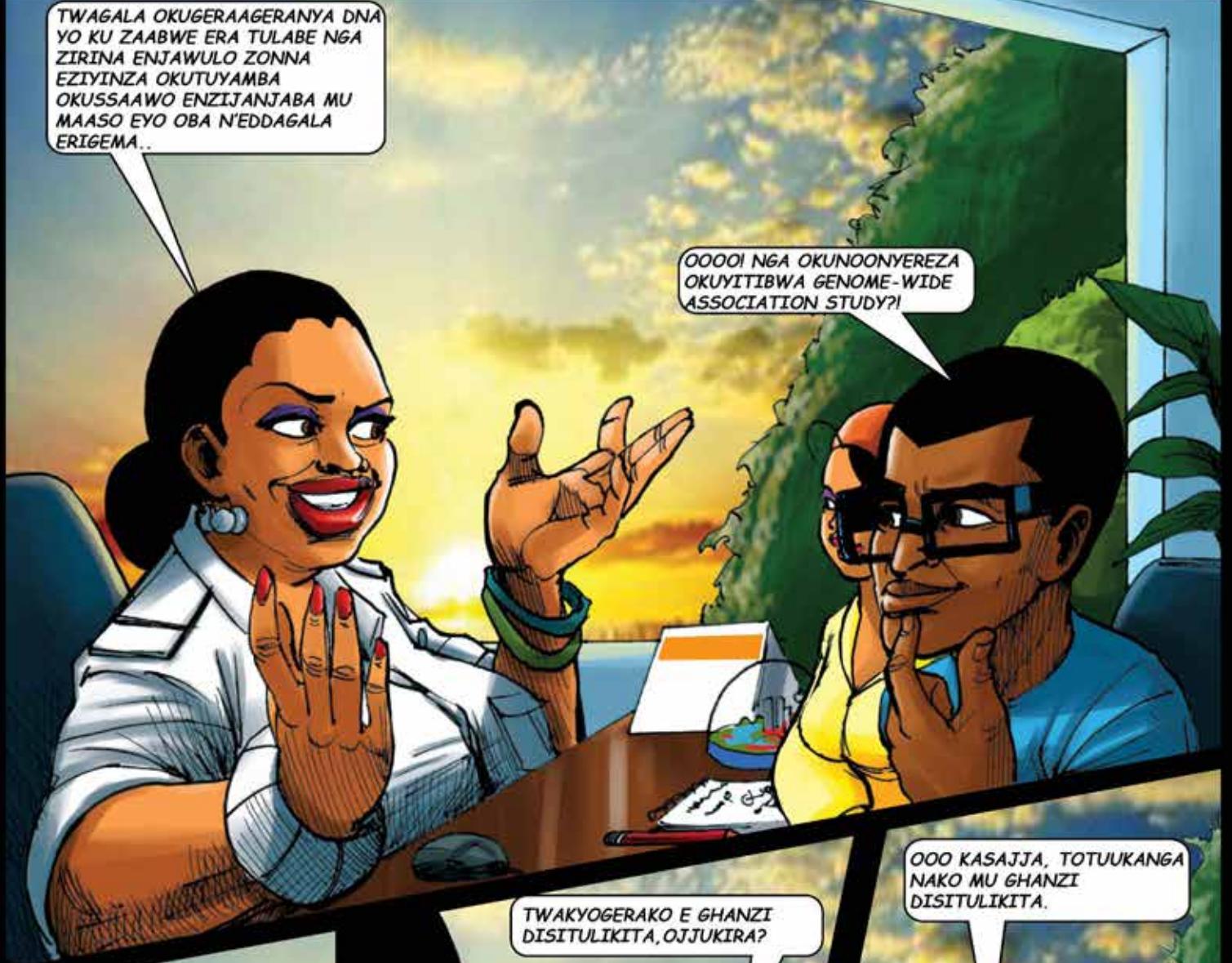
OKUNOONYEREZA KUTUNULA KU
DNA YO NE DNA ZA ABAANA
ABALALA. OJJUKIRA ENGERI
GY'OTAATANDIKA BUJJANJABI
OKUTUUSA NGA OWEZEZZA
EMYAKA KKUMI (10)?



OTYO, EKYO TUKIYITA OMUNTU AL
WAWO OKUGWA WANSI. ABAANA ABAMU
ABALINA AKAWUKA KA MUKENENYA
BETAAGA OBUJJANJABI MU MYEJI
EMITONO EGISOOKA EGYOBULAMU
BWABWE

ABO TUBAYITA
ABANGUWA
OKUGWA WANSI.





TWAGALA OKUGERAAGERANYA DNA
YO KU ZAABWE ERA TULABE NGA
ZIRINA ENJAWULO ZONNA
EZIYINZA OKUTUYAMBA
OKUSSAAWO ENZIJANJABA MU
MAASO EYO OBA N'EDDAGALA
ERIGEMA..

OOOO! NGA OKUNOONYEREZA
OKUYITIBWA GENOME-WIDE
ASSOCIATION STUDY?!



TUBIVEEKO, KATWOGERE
OKUKUWANDIKA MU KUNOONEREZA
KYE KUTEGEEEZA GY'OLI. BULI MYEZI
MUKAAGA (6) OJJA OKUKUKEBERA
ERA N'AKAYISO.

BW'ONOYINGIRA MU
KUNOONYEREZA, TUJJA
KUGGYAKO AKASAAYI
AKEYONGERAKO KATONO KU
NNAKU EZO.

OOO, OBUYISO OBULALAI ?

ERA NGA TEWAKYALI
KUKYALIRA KIRINIKAA??



NEDDA, TOWAJJA KUBEERA
BUYISO BUSINGA BW'OFUNA
KATI- ERA NE NNAKU ZO
EZ'OKUNOONYEREZA ZIJJA
KUBEERA Z'EZIMU N'EA
KIRINIKAA...

EKYO KIKULUI



KAAKATI KA TWGERE KU
KUKKIRIZA NGA OTEGEEZEBWA
OKUKKIRIZA NGA OMAZE
OKUTEGEZEZBWA KITEGEEZA
NTI OWA OLUKUSA O
LWEKINTU.

MU KINO OTUWA OLUKUSA
OKUKOZESA OMUSAAYI GWO
MU NNOONYEREZA. KIKULU NNYO
DDALA OKUTEGEERA BINO
WAMMANGA NGA TONNAWA
LUKUSA: LWAKI TUNOONYEREZA,
KIKI EKINA KOLEBWA NGA
OKUNOONYEREZA KUGENDA MU
MAASO, ERA NTI ANI ANALABA
KU BINAAVA MU EBINAAVA MU
MUSAAYI GWO'. KAAKATI
KATUYITEMU NATE MU BINTU..

KITSO EKITUNDU
KINO KIKULU NNYO.
OKYALI NANGE?



YYEE NAYE NNIMU KATONO KE...

OWANGE KWATA...
WUU MANYA
XUKURI...

WEBALE
OMUBISI...
SSEBO.

KITSO OL'OKUBA TONNAWEZA
MYAKA ABIRI MU GUMU (21),
SSENGA WO NAYE AJJA
KWETAAGA OKUSSA OMUKONO
KU KWANDIIKO KY'OKUKKIRIZA
NGA OMAZE OKUTEGEEEZEBWA...

KATI OLWO KIBA KITYA
SSINGA SSENKA "AGAANA"
NZE NE "NZIKIRIZA"?

KUBANGA TONNASAJJAKULA
KITSO, OMUNTU OMUKULA
AJJA KWETAAGA OKUTUWA
OLUKUSA. NAWE OJJA
KUTUWA OLUKUSA KITSO,
NGA OSSA OMUKONO KU
LUPAPULA LW'OKWEWAAYO,
OLULINGA OKUKKIRIZA NGA
OMAZE OKUTEGEEEZEBWA
OLW'ABAANA.

KATI OLWO KIBA
KITYA SSINGA
SSENKA "AGAANA"
NZE NE "NZIKIRIZA"?

EKIBUUZO KIRUNGI. TWETAAGA
GGWE NE SSENKA WO OKUWA
OLUKUSA GGWE OKUYINGIRA MU
KUNOONYEREZA. OLOWOOZA KI
KITSO?

KALE, ATE OMUSAAYI GWANGE?
MMANYI NTI MU KIRININKA BAPIMA
OBUNGI BW'ABUSERIKALE N'OBW'
AKAWUKA, NAYE KATI OGENDA
KUGUKOLAKO BYA KUGESEZA?!
BANNASSAYANSI TEBAGENDA
KUNVIISAAMU BANTU BALALA?

NEDDA KASAJJA HAHHA.
KANNYINNYOLE. MU
KUNOONYREZA KUNO
TUKOZESA OKUKKIRIZA NGA
OMAZE OKUTEGEEEZBWA
OKUGAZIYIBBWA. E KYO
KITEGEEEZA NTI BA
NNASSAAYANSI BAYINZA
OKUKOZESA OMUSAAYI GWO
GWE TUGENDA OKUKUUMIRA
MU MUNNYUMBA EYENJAWULO
GYE GUTAATUSIBWEKO KABI
KONNA EYITIBWA BIOBANK-
OKUKOZESEBWA MU
KUNOONYEREZA OKULINA
AKAKWATE N'EBY'OBULAMU
OKULBEERAWO GYE BUJJA.

OBA OLI AWO BA
NNAASSAAYANSI
ABALIBEERAWO GYE BUJJA
BALISOBOLA OKUKOLA
EDDAGALA ERIGEMA AKAWUKA
AKALEETA MUKENENYA
N'AKAFUBA. TEKINNABA
KUSOBOKA, NAYE OMUSAAYI
GWO GUGENDA KUBEERAWO
WE BALIKKOLERA. KALE,
TEWALI, TEWALI MUNTU
N'OMU AGENDA
OKUKUVISAAMU OMUNTU
OMULALA.

WALIWO AKAKISA KONNA
NTI BA NNAASSAAYANSI
BAYINZA OKUMPA AMAANYI
AG'ENJAWULO NGA AGAGO?



NEDDA KASAJJA, FFE
TWAGALA KUFUULA BANTU
BABEERE ABALAMU. ERA
FFENNA TUMANXI NTI
ABALINA AMAANYI
AG'ENJAWULO BAABULIMBA.

OGAMBA OTYA SSENG
A? NYENDA KUSSA
OMUKONO KU "YYEE"
KU LUPAPULA LWANGE
OL'W'OKWEWAAYO
NGA OMAZE
OKUTEGEEEZBWA.

NZE OKUSSA OMUKONO
KU KIWANDIJKO KYANGE
EKY'OKUKKIRIZA NG'OMAZE
OKUTEGEEEZBWA, NJA
KUKIKOLA SSINGA
OKUNOONYEREZA
TEKULINA KABI ATE
ERA NGA KULIMU
OMUZINZI.



NDOWOOZA OKUNOONYEREZA
KUKULU. ERA NTEGEERA
ENGERI GYE KUGENDA
OKUKOLEBWAAMU, OKUKUUMA
EKYAMA, NE BAANI ABAGENDA
OKULABA EBIVAAMU. OL
W'ENSONGA ENO NJA KUSSA
OMUKONO KU "YYEE".

OKUNOONYEREZA TUKULINA KABI
KONNA NNYABO-TEWALI KYE
TUGENDA KUKOLA EKISUKKA KU
BYE TUKOLA NGA AZZE OKUMULA
BIRIRA, ATE TUKOLA KYONNA
EKISOBOKA OKUKAKASA NTI
TETUSAMWASSAMWA NA BYA
KASAJJA. NAYE SSIYINZA
KUKUSALIRAWO OBA
OKUNOONEREZA KULIMU
OMUSINZI. E KYO GGWE OLINA
OKUKYESALIRAWO..



AAAALO, NZE DR. MOSENODI,
KISEERA KYA KUKUKEBERA,
KITSO.

NEDDA, GGWE DR. MATOVU.
MBADDE NNAKAKULABA
NGA OTAMBULA NGA OYITA
MU KISENGE!

AHAA, GGWE (YOU)
MUSAJJA. OKUTEEBEREZA
OKLINGA OKWO.

ZWING!

NYENDA KUKOZESA
AKAWULIRIZA OKUWUL
IRA OMUTIMA GWO BWE
GUKUBA N'AMAWUGGWE.
OFUNYEEMU OKUKOLOLA
MU NNAKU ZINO?
OBULUMI BWONNA?

NEDDA, JJUKIRAI NNATEBUKA
AKATOFFAALI AKEEWESI
BWE NNAFUILIBWA
AKASIRIKITU MU NDA
YOMUSUWA.

SIRINAAKO
AKANUUBULE
YADDE.

AAAALO KASAJJAI NZE MMONI,
KAFUMISI WO-ERYO ERINNYA
ERY'AMAJJOLOBERA LYE
LIYITIBWA OMUNTU AGGYAKO
OMUSAAYI.

WATEGEDDE NTI TWETAAGA
OBUGIJKO BWA SSUUKAALI
BUSATU BWOKKA
OW'OKUNOONYEREZAI?
OGUSIGADDE GWA KUKOZESEBWA
OKUKUKEBERA EBYA BULIJJO.

EKO KKI MULENZI WANGE?
SSI NSONGA, BULI KIMU
KIRABIKA NGA KIRAMU. OLI
WA MAANYI NGE SSEDDUME.

OOOH, MBADDE NDOWOOZA NTI
BAKANYWA MUSAAYI EKO KYE
BAKOLA?



KALE, TUGENDE MU MAAOSA,
OKUSOOKA KA TUTANGAAZE
AKACUPA KO MU KYUMA KI
KALIMAGEZI TULONDOOLE
OMUSAAYI, OLWO
TUBUGUMYE OMUSAAYI GWO
MU BBAAFU Y'AMAZZI.

KATI OLWO NGA OMUSAAYI
GWO BWE GULUNGIYE ERA NGA
GWOKYA TUGENDA
OKUGWETOOLOOZATOOLOOZA
MU KUUMA KAFFE
AKEETOOLOOZATOOLOOZA
TWAWULE EBITUNDU
EBY'ENJAWULO
EBY'OMUSAAYI GWO.

BUNO BWE BUTOFFAALE
OBUMYUFU OBULI
WANSI, OLUZZIZZI
LULI MU MASEKKATI...

ATE OBUTOFFAALE
OBUTALINA LANGI
BULI KU NTIKKO,
KITUUUFU?

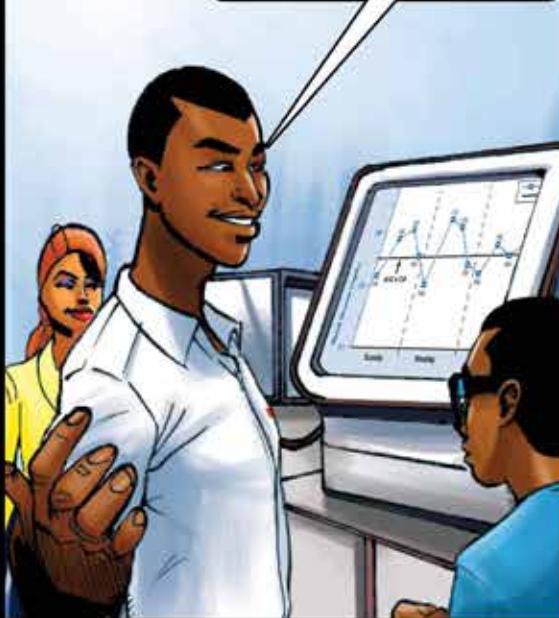
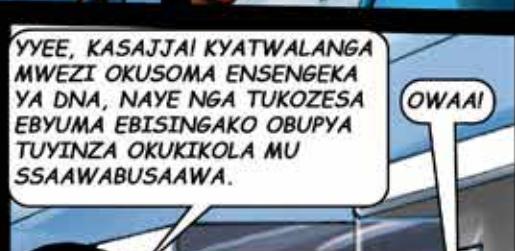
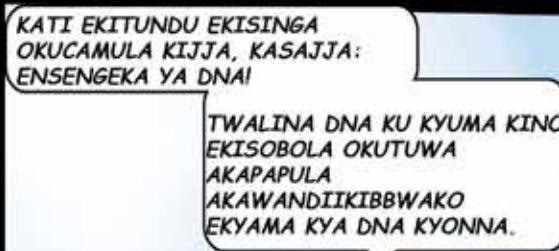


EKO KITUUUFU KITSO-ERA
OMWO MWE TUJJA DNA.
TUGENDA OKWONGERA
OKUGATTAKO "EBIRUNGO"
EBIRALA EBITONOTONO"
OKWASAAYASA
OBUTOFFAALE
TWAWULEKO DNA.

NGA TETUNNASENGKA,
TUGATTA DNA KU KIPIMA
OBUMUNYEENYA OKUKASA
NTI ANOZE BULUNGI.

EBYO BYONNA GGWE
OBIKOLA WEKKA,
KU BULI MULWADDE?

KISINGIRA DDALA OBW'O
MUNTU, SI KYEKYO?
(AMUTEMYAKO)



KASITA ENSENGEKA YA BALWADDE
BONNA EGGWA, TUYINZA
OKUGERAAGERANYA OBUTOFFAALI
BWABWE BWONNA OBUKOLA
EKIRAMU KYONNA NE TUNOONYA
EBY'OKULONDoola EBIPYA
EBY'EDDAGALA NE DDAGALA
ERIGEMA

EKO KYEWUUNYISA NNYO
-NAYE NDOWOOZA KYE
KISEERA TUDDEYO MU
KIRINIKI.

WEBALE, MARANYANE.

SSIYINZA KU
KIKKIRIZA NTI
OMULIMU
OGUTEKEBWA MU
KEGEZESAGEZESA
KUNO MUNENE BWE
GUTYO.

KISAMAALIRIZA NNYO.
NNEEGOMBABWEGOMBI
NTI NANGE SSINGA NNINA
WENNYINZA OKUYAMBIRAI!

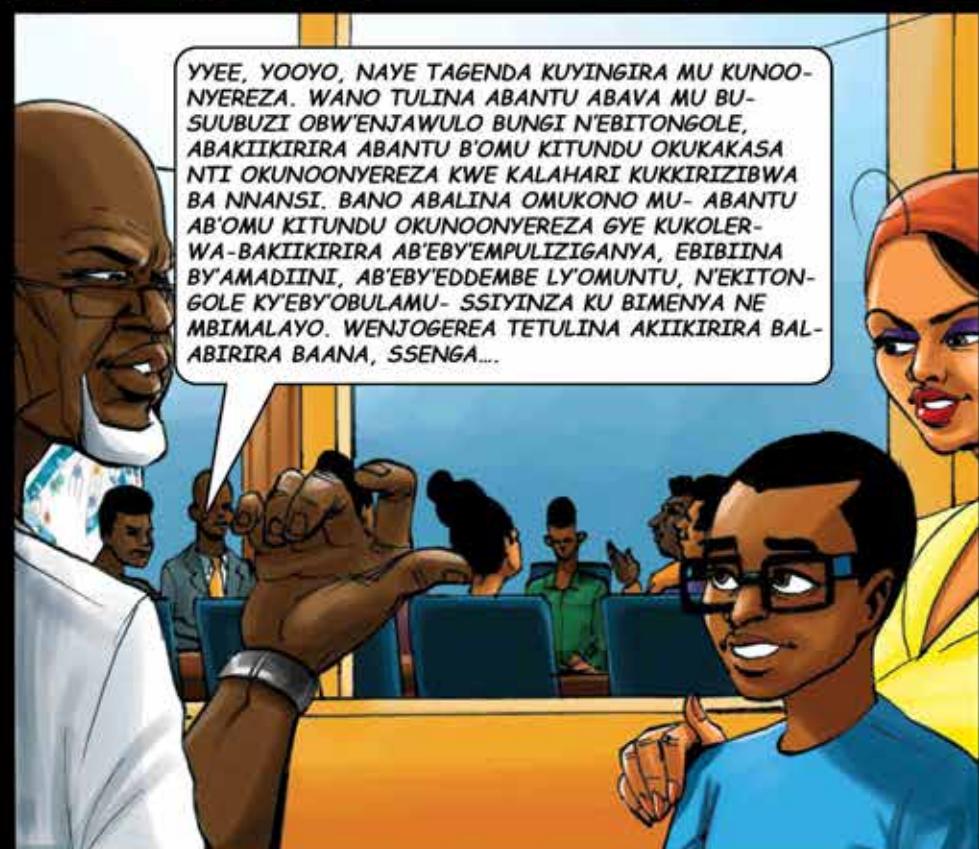


NNYINZA OKUBA NGA
NNINA EKIRALA KU MUTIMA
MUNGOBERERE..

KANO KE KAKIIKO K'ABAWI
B'AMAGEZI AB'OMUKITUNDU,
AKATEESEZA MU KISENGE KYA
KIRINIKI EKINENE.



OYO YE MWAMI BATHOENG,
YE MUKULU W'AMASOMERO
GANGEI NAYE AGENDA
KUYINGIRA MU KUNOONYEREZA?



YYEE, YOYO, NAYE TAGENDA KUYINGIRA MU KUNOONYEREZA. WANO TULINA ABANTU ABAVA MU BUSHUBUZI OBW'ENJAWULO BUNGI N'EBITONGOLE, ABAKIIKIRIRA ABANTU B'OMU KITUNDU OKUKAKASA NTI OKUNOONYEREZA KWE KALAHARI KUKKIRIZIBWA BA NNANSI. BANO ABALINA OMUKONO MU- ABANTU AB'OMU KITUNDU OKUNOONYEREZA GYE KUKOLERA-BAKIIKIRIRA AB'EBY'EMPULIZIGANYA, EBIBIINA BY'AMADIINI, AB'EBY'EDDEMBE LY'OMUNTU, N'EKITONGOLE KY'EBY'OBULAMU- SSIYINZA KU BIMENYA NE MBIMALAYO. WENJOGERE A TETULINA AKIICKIRIRA BALABIRIRA BAANA, SSENGA...

KY'OGAMBA NTI
NSOBOLA OKUTUULA
KU KAKIIKO KA
BANTU AB'OMU
KITUNDU?

BW'OB A OYAGALA
OKUKATUULAKO,
TUJJA KUSANYUKA
OKUBEERA NAWE..

TEWALI KU
WANNAANYA!!

ATEABAANA NGA
NZE? NAFFE TULINA
AKAKIIKO?

LWAKI T
OLINGIZAKO
MU DDIRISA,
KASAJJA?

ABAANA ABO
BONNA BE BAANI

E KYO KYE KIBIINA
KY'ABAVUBUKA BA WANO-
EKIBINJA EKISISINKANA
OMULUNDI GUMU MU
MWEZI OKUYIGA
EBIKWATA KU SSAAYANSI,
EBIBEEZAAWO OMUNTU MU
BY'ENFUNA, ERA N'OKUFUNA
ABANTU AB'OMU KITUNDU
AB'ENYIGIRA MU KIRINIKA
YAFFE.

NNYINZA
KUYINGIRA
DDI?

KA TULABE... KIRI
KITYA BWE
KIBEERA LEERO?



MU KIBIINA KY'
ABAVUBUKA
WASANYUKIDDEYO?

YYEE! TWAYIZEKU BIKWATA
KU KUBUUZIBWA NGA OSABYE
OMULIMU, NNASISINKANGE
AKABINJA K'ABAANA
ABALUNGI OKUVA E KAMPALA
ERA NE BATUSOMESA KU DNA
KYOKKA EBYO BYONNA
NNABADDE MBIMANYI...

OOOH, OKUVA MU
MISOMO GYO KU
SSOMERO?

NEDDA, SSENDAI
BULIJJO NKUBUULIRA
-KUVA MU BAZIRA
MU BAZIRA?

KALE, KITSO, BAZIRA
MU BAZIRA KI?

BULI OMU GWE
TUSISINKANGE LEERO:
BONNA BAZIRA MU
BAZIRA NGA BWE
NNAKUGAMBAI

DR. MOSENODI MU DDALA
YE DR. MATOVU! BONNA
BAZIRA MU BAZIRA DDALA
ABALINA AMAANYI
AGENJAWULO!

NTEEBEREZA NTI OLI
MUTUUFU; BONNA
BAZIRA MU BAZIRA
BAFFE MU NGERI YABWE.
EBINTU BYE BATUKOLERA-
OKUWONYA OBULWADDE,
OKUTUKUMA NGA TULI
BALAMU.

OKUFAANANA NAWE,
KASAJJA, OKUYINGIRA
MU KUNOONYEREZA..



EBINNYONNYOLA

EBIKOZESEBWA MU SSAAYANSI

OBUFUDDAMWAKO OBUTESIGAMA KU KIKULA KYA MUNTU- OBUSIKA BW'ENJAWULOYAWUL OBA ENDWADDE OMULI NTI EBIKOLA EKIRAMU KYONNA BY'OMBI WEBIRI OMUNTU OYO ALYOKE AFUNE EKY'ENJAWULOYAWUL OBA OBULWADDE.

OBUSIRIKALE BW'OMUSAAYI-

OBUTOFFAALI BW'OMUSAAYI OBUTALINA LANGI OBWENYIGIRA MU KULWANYISA OBULWADDE. BUNO BWE BUTOFFAALI OBULUMBIBWA AKAWUKA KA MUKENENYA ERA BWE BUTOFFAALI AKAWUKA MWE KAZAALUKIRIA.

CCR5- EKIZIMBA OMUBIRI EKIBEERA KU BUTOFFAALI BW'OMUSAAYI OBUTALINA LANGI OBUKOLA NGA EKIYINGIRIWAMU AKAWUKA KA MUKENENYA. AKAWUKA KA MUKENENYA EBISEERA EBISINGA KAKAKOZESA CCR5 OKUYINGIRA MU BUTAFFAALI BWE KATEEGA. ABANTU ABAMU BABEERA NE CCR5 EYAKYUKAAKYUKA ERA TEBATERA KU KWATIBWA KAWUKA KA MUKENENYA.

OKULONDAMU KW'OBUTONDE-ENKOLA EREETERA EBINTU EBIGUMIRA EMBEERA GYE BIRIMU OKUSINGA KU BINNAABYO BITERA OKUWANGAALA EKIWANVU ERA NE BIZAALA NE BINNAABYO. EKIROWOOZO KINO KYAYANJULWA CHARLES DARWIN.

OBULEMA BW'OMUSAAYI- AKATOFFAALI K'OMUSAAYI AKEEWESEEMU NGA OMWEZI OGW'EGGABOGGABO AKALINA EKYETIKKA EMPETO ESSIBWA ENNAMU EKITAKOLA BULUNGI. OBUTOFFAALI BUNO OBWEWESE BULEETEBWA OBULWADDE OBW'ENSIRANO OBUYITIBWA OBULEMA BW'OMUSAAYI. OBUTOFFAALI OBWEWESE BUZIBUWALIRWA OKUTAMBUZA EMPETO ESSIBWA OKUGITWALA MU BITUNDU BY'OMUBIRI EBITALI BIMU.

THE BLACK DEATH -ERA OBUMANYIDDWA NGA KAWUMPULI; BWE BUMU KU BULWADDE MU BYAFAAYO OBWASINGA OBUKAKALI OBWASAASAANIRA AMAWANGA GONNA OBULEETEBWA AKAWUKA AKALWAZA AKAYITIBWA YERSINIA PESTIS

OKUKKIRIZA KW'ATANNEETUUKA-ENDAGAANO EKOLEBWA OMUNTUATASOBOLA KUKKIRIZA MU MATEEKA AMATUUUFU, NGA AKOZESA OKUKKIRIZA NG'OMAZE OKUTEGEZEZEBWA

OKUKKIRIZA NG'OMAZE OKUTEGEZEZEBWA OKUGAZIYIZIBBWA-ABEENYIGIRAMU MU KUNOONYEREZA OKW'EBY'OBUSAWO BAWA OKUKKIRIZA NGA OMAZE OKUTEGEZEZEBWA OKUKOZESEBWA MU KUNOONYEREZA OKW'OMU MAASO

EKYETOOZATOOZA-EKYUMA EKIKOZESEBWA AWAKEBERERWA OMUSAAYI OKWAWULA OLZZIZZI OLW'OBUZITO OBW'ENJAWULO, NGA LWETOLOOZATOOZA EBY'OLZZIZZI KU MBIRO EMPITIRIVU ENNYO.

OKUKKIRIZA NGA OMAZE OKUTEGEZEZEBWA- ENDAGAANO EKOLEBWA OMUNTU AKKIRIZIBWA MU MATEEKA OKUWA OKUKKIRIZA NGA AMAZE OKUTEGEZEZEBWA.

OKUSENGEKA DNA-ENKOLA ESOBOZESA ENTEEKATEEKA Y'OBUSIGA MUNDA Y'OLUWUZI LWA DNA.

EKIBALA OBUMUNYEENYA-EKYUMA EKIKOZESEBWA OKUPIMA OBUNGI BW'OKUMUNYEENYA OKUMANYA OBUNGI BW'EKINTU EKIPIMWA WE BWENKANA.

OKULWAWO OKUGWA WANSI- ABANTU ABALINA AKAWUKA KA MUKENENYA ABATWALA EBBANGA EGGWANVU OKULAGA OBUBONERO, OKUVA KU BISEERA LWE BASOOKA OKUBULAGA.

AGGYAKO OMUSAAYI (KAFUMISI)-ABANTU ABATENDEKEBWA OKUGGYA OMUSAAYI OKUVA KU BALWADDE, OKUGUGABA, OKUGUGUSSA MU MUNTU OMULALA OBA OKUGUKEBERA MU KYUMA.

AYANGUWA OKUGWA WANSI- ABANTU ABALINA AKAWUKA KA MUKENENYA ABANGUYIRIZA OKULAGA OBUBONERO, OKUVA KU BISEERA LWE BASOOKA OKUBULAGA.

REAGENTS-EBIRUNGO EBIRALA EBITEEKEBWA MU MUSAAYI OKUKUTULAKUTULA OBUTOFFAALI N'OKUGWAWULAKO DNA.

AKAWULIRIZA-EKINTU EKIKOZESEBWA ABASAWO OKUWULIRIZA AMALOOBOOZI AGAKOLEBWA MUNDA MU MUBIRI OKUGEZA NGA OKUKUBA KW'OMUTIMA.

**OKUMEMENTULA EKY'EKYAMA : KASAJJA AYITAAYITA MU
DNA NE MU BUTOFFAALI OBUKOLA EKIRAMU KYONNA.**

**EKYAWANDIIKBWA MU NSI BOTSWANA MU KIRINKA Y'ABAANA BOTSWANA-BAYLOR
OMUTENDEROGUSOOKA (1.0), KYASOOKA KUFULUMIZIBWA MU 2015 OBWANNANYINI ©
BOTSWANA-BAYLOR CHILDREN'S CLINICAL CENTRE OF EXCELLENCE 2015**

OKWEBAZA

ABATONDAWO PULOJEKITI N'ABAGIYIIYA: ABRAHAM MAMELA, ALBERT LEKGABA, EDWARD PETTITT

ABAWANDIISI B'OMUZANNYO: STEPHEN ALEXANDER MANNING, NATASHA MORAKA, JONATHAN STRYSKO, TSWELELOPELE MASUTLHA, TIERRA HOLMES, AAMIRAH MUSSA, ZACK BONZELL

ABAKUNYAAANYA BE BY'OBUSAZO/BE BYA SSAAYANSI: MASEGO TSIMAKO-JOHNSTONE, SEBALD VERKUIJL

ABAYAMBI MU PULOJEKITI: THATO REGONAMAYE, TAPIWA KANGWA

ABAVUBUKAABALINA KYE BASSAAMU: ANNAH KETLAARENG

ABANOONYEREZA MU CAFGEN (BOTSWANA-BAYLOR CHILDREN'S CLINICAL CENTRE OF EXCELLENCE): GABRIEL ANABWANI, MBCHB, MMED, MSCE, FRCPE; MOGOMOTSI MATSHABA, MBBCHEAO, BMEDSCI; KEOFENTSE MATHUBA; OLEKANTSE MOLATLHEGI; ABHILASH SATHYAMOORTHI; JOHN FARIRAI; LEANO PHETOGO; KENNEDY SICHONE; MASUTLHA TSWELELOPELE, CLINS MMUNYANE, PINKIE GOBUAMANG

AKAKIICO AK'ABAWI BA CAFGEN AMAGEZI AB'OMUKITUNDU: SHEIK H. HASSAN (BOTSWANA MUSLIM ASSOCIATION); TIDIMALO DENNIS (BOPHA: BOTSWANA PUBLIC HEALTH ASSOCIATION); CINDY KELEMI (BONELA: BOTSWANA NETWORK ON ETHICS, LAW, AND HIV/AIDS; IRENE KWAPE (BOCAIP: BOTSWANA CHRISTIAN AIDS INTERVENTION PROGRAMME); PHENYO MAHUMA (BCC: BOTSWANA COUNCIL OF CHURCHES); ALICE MOGWE (DITSHWANELO: THE BOTSWANA CENTRE FOR HUMAN RIGHTS); KGORELETSO /NAKAYONDO MOLOSIWA (BONEPWA+: BOTSWANA NETWORK FOR PEOPLE LIVING WITH LLLV AND AIDS); ONKEMETSE MONTSHEKI (CHILDLINE BOTSWANA); JOB MORRIS (SAN YOUTH NETWORK); KAGO MOTEKETELA (YOUTH MEMBER); BUYANI ZONGWANI (MISA: MEDIA INSTITUTE OF SOUTHERN AFRICA)

OKKUVUNULA O'LUNGEREZA KWAKOLEBWA: JACQUELINE BALUNGI KANYWA, ISREAL KALYESUBULA

OKKUVUNULA O'LUGANDA KWAKOLEBWA: MUGEMBA JAMES KATUMBA, PATRICK MASEMBE

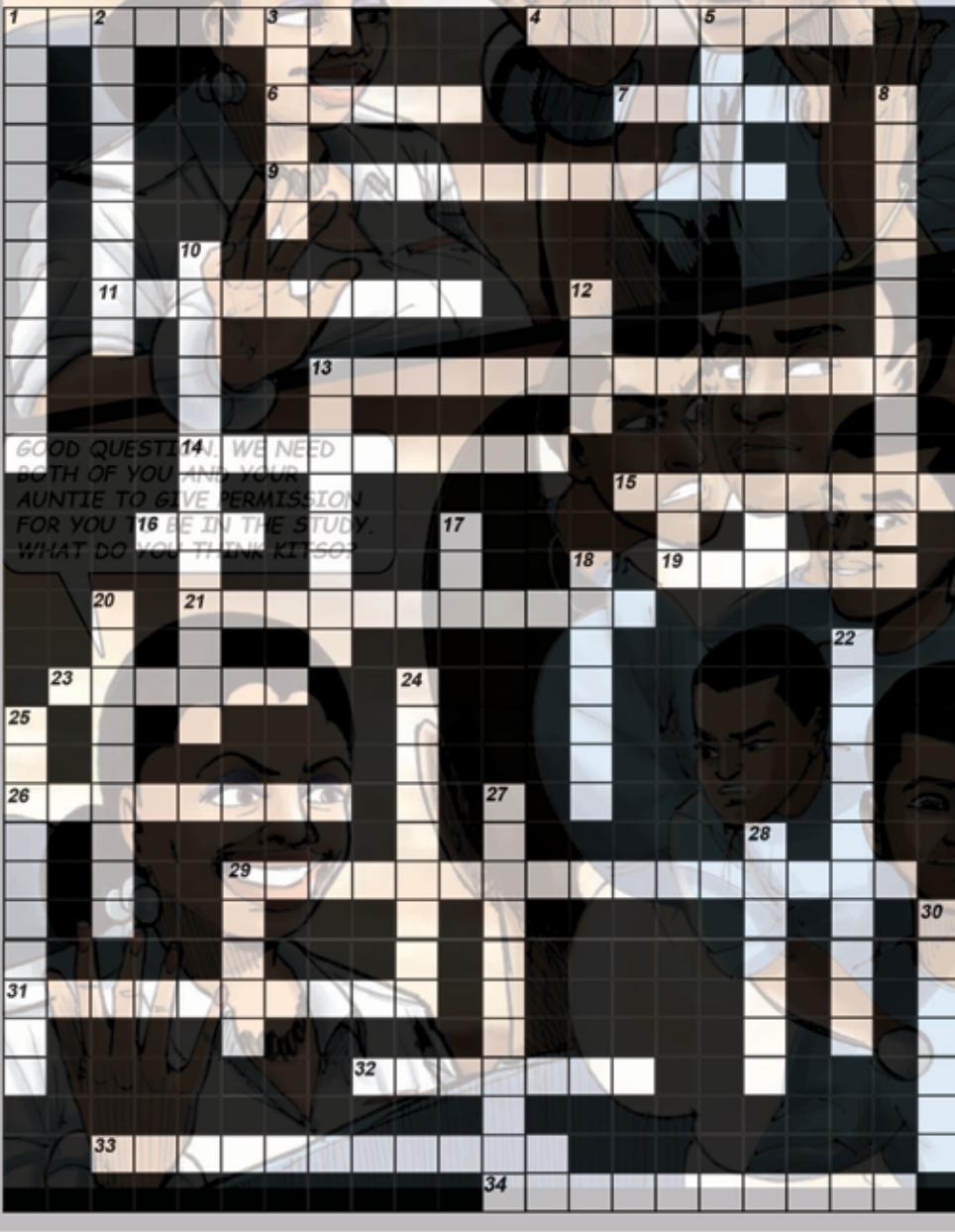
OKWETEGULA

YADDE TUKOZE EKISOBOKA OKULABA NTI SSAAYANSI AKOZESEBBWA YOYO OMUTUUFU, EBIWANDIIKBWA MU KITABO KINO TETEGEEZA NTI MAGEZI AGAWEEBWAKU BY'OBULAMU. ETTEEKA GYE LIVA NE GYE LIKOMA, ABAWANDIISI N'ABAAKUBA MU KYAPA EKITABO KINO N'ABAKOZI BAABWE TEBAKKIRIZA OKUVUNAANYIZIBWA EBY'OBULABE, EBY'OKUFIRIZIBWA OBA EBY'OKWONOONA BYONNA EBINATUUKA KU MUNTU EYESIGAMA ENNYO KU BYE TUWANDIISE.

EKITABO KINO TWAKISSAAKO ENVUMBO

TEWALI KITUNDU KY'EKITABO KINO EKIJJA OKUWANDIIKBWA NATE, OBA OKUTEEREKEBWA MU BYUMA BI KALIMAGEZI OKUKISOBOZESA OKUGGULIBWAWO NATE MU BYUMA EBIRALA OBA OKUWEEREZEBWA MU NSABIKA EYA BULI NGERI OBA OKUYISIBWA MU MIKUTU EGITALI GIMU NGA OKUYITA KU MUTIMBAGANO, OKWETIKKIBWA, OKUKOPPOLOLWA, OKUKWATIBWA KU KATAMBI OBA MU KUYITA MUNGERI ENDALA ZONNA AWATALI KUWEBBWA LUKUSA OKUVA KIRINKA Y'ABAANA EYA BOTSWANA ESANGIBWA KU KIBANJA 1836 KU LUGUUDO HOSPITAL WAY, MU DDWAALIRO PRINCESS MARINA HOSPITAL, KU NDAGIRIRO PRIVATE BAG BR 129, GABORONE, BOTSWANA

CROSSWORD PUZZLE



ACROSS

- The process of passing traits and genetic characteristics from parents to their offspring.
- A list of ancestors, a family tree.
- One of two copies of each gene.
- A coiled structure of DNA.
- An infectious bacterial disease that can affect almost any tissue in the body, especially the lungs.
- A measure of the number of viral particles present in an organism.
- A diagram that is used to predict an outcome of a particular breeding experiment.
- A jelly-like fluid that fills each cell and is enclosed by the cell membrane.
- A lab test that measures the amount of CD4 cells.
- A type of virus that infects and destroys the body's immune system.
- An agreement by an individual not competent to give legally valid, informed consent.
- The process at which proteins are created at ribosomes.
- All the collective DNA contained in the chromosomes of an organism.
- A change in the DNA code, an addition, a deletion or a substitution resulting in a different protein being produced.
- When a certain trait is stronger than its opposite.
- several membrane-bound compartments with specialized functions that are present in the cell cytoplasm.
- A membrane-bound sac in plant or animal cells that is involved in storage or transport of the products of metabolism.
- Linear strands of DNA found in the nucleus of most living cells, carrying genetic information in the form of genes.
- An abnormal, crescent shaped red blood cell containing defective haemoglobin, caused by a hereditary disease called sickle cell anaemia.

ANSWERS



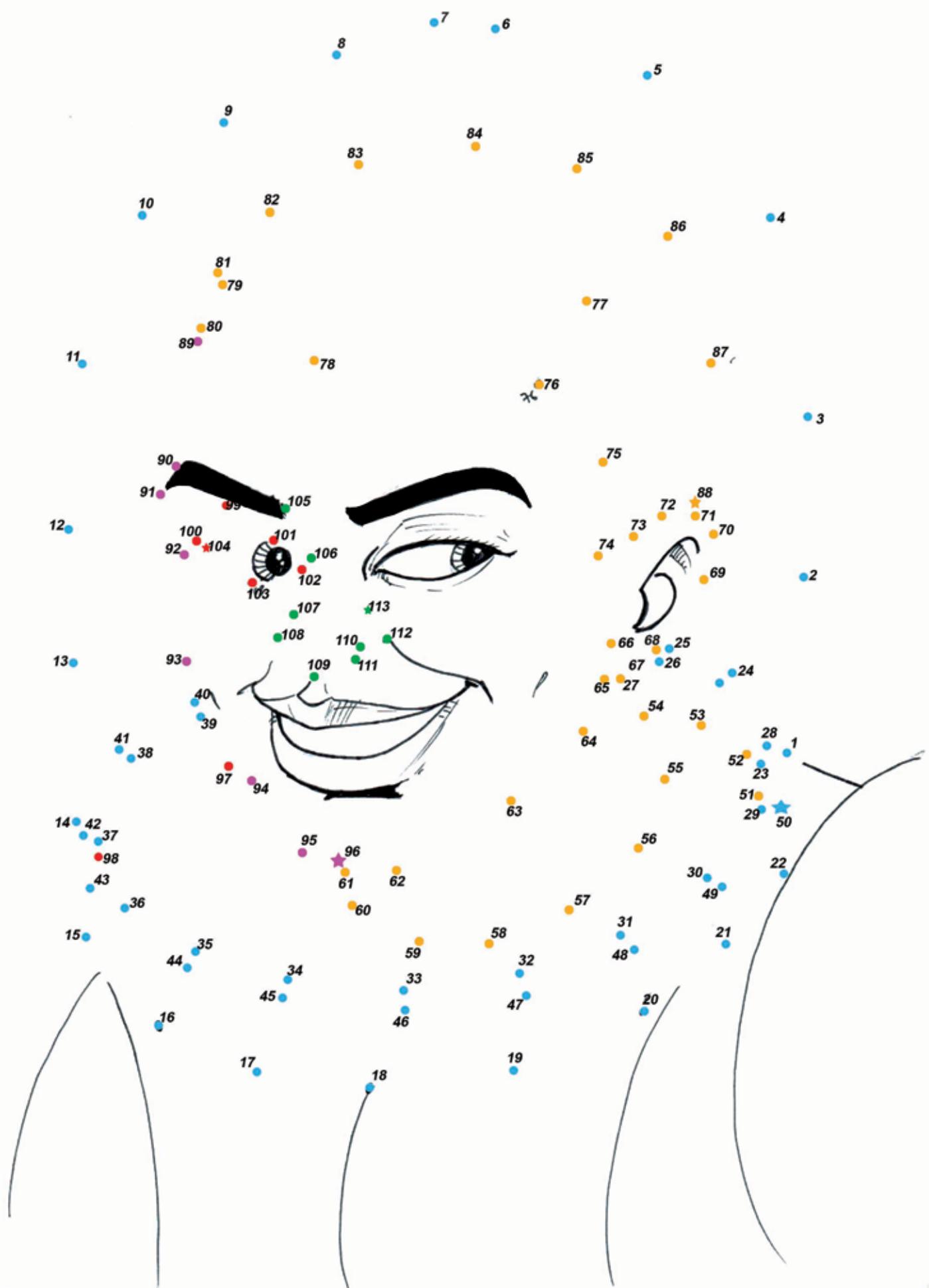
DOWN

- Two different forms of a gene.
- An allele/gene copy most likely to stay hidden in offspring.
- Specific physical characteristics of organisms that make them unique.
- An organelle consisting of a stack of flattened sacs that is involved in the modification and sorting out of proteins.
- A thin biological membrane that separates the contents of the cell with the external environment.
- A process involved with the synthesis of proteins where a DNA template is used to make RNA.
- A building block of DNA.
- Molecules composed of one or more chains of amino acids.
- Ribonucleic acid.
- An agreement by an individual that is competent to give legally valid, informed consent.
- The set of observable characteristics of an individual resulting from the interaction of its genotype with the environment.
- Small leucocytes (white blood cells) with a single round nucleus, occurring especially in the lymphatic system.
- Protein molecules on the surface of cells to which complementary molecules such as hormones or antibodies recognize and bind.
- An individual having two identical alleles of a particular gene or genes and so breeding true for the corresponding characteristic.
- The building blocks of nucleic acids, RNA and DNA.
- An infectious disease caused by parasites such as mosquitoes.
- Part of every cell that carries information that determines the features or characteristics inherited from parents.
- Extra ingredients added to blood to break up cells and isolate DNA.

GENOME ADVENTURES



CONNECT THE DOTS...





GENOME ADVENTURES

OBUVUMBUZI BWE BY'OBUTONDE BW'EBINTU EBIRAMU KYA KUYIIYA KYA COMMUNITY ENGAGEMENT INITIATIVE OF THE COLLABORATIVE AFRICAN GENOMICS NETWORK (CAFGEN) EKISASULIRWA WELLCOME TRUST. CAFGEN KIRI MU KIBIINA KYA HUMAN HEREDITY AND HEALTH IN AFRICA CONSORTIUM (H3AFRICA) KIKUBERIZIBWA AB'EDDWAALIRO LY'ABAANA ERIYITIBWA BOTSWANA-BAYLOR CHILDREN'S CLINICAL CENTRE OF EXCELLENCE (COE). OBUVUMBUZI BWE BY'OBUTONDE BW'EBINTU EBIRAMU KIKOZESA AMASOMO AGAFULA ABANTU OKUBEERA AB'OBUSOBOZI, EMIZANNYO EGIYIGIRIZA, WAMU N'EMPULIZIGANYA EZ'OLUKALE OKUKUNGA ABATUUZE BE KIKWATAKO, BANNAMAWULIRE ERA N'ABANTU BONNA OKUTWALIRA AWAMU- OKUSINGIRA DDALA ABAVUBUKA- MU ESSOMO MU MUSOMO GW'ENKULA Y'EBINTU EBIRAMU NE MUKUNOONYEREZA KU BY'OBUTONDE BW'EBY'OBUSAUTO. EKIGENDERERWA KY'OBUTABO BWAFFE OBW'EBYOBUVUMBUZI BWE BY'OBUTONDE BW'EBIRAMU KWE KUSOMESA ABASOMI EBYAFAAYO BY'ENSIKIRANO N'OMUSOMO GW'ENKULA Y'OMUNTU, ENKULA N'ENKOLA YA DNA N'OBUTOFFAALI OBUKOLA EKIRAMU KYONNA, OLUJEGERE OLUGATTU ESSOMO MU MUSOMO GW'ENKULA Y'EBINTU EBIRAMU. N'OBULAMU, N'ENGERI Y'OKWEWANDIISA MUKUNOONYEREZA MU BY'OBUTONDE BW'EBY'OBUSAUTO OBA ESSOMO MU MUSOMO GW'ENKULA Y'EBINTU EBIRAMU, NGA MW'OTWALIDDE AMATEEKA AGAFUGA OKUKOLA OKUNOONYEREZA AGEKUUSA KU KUKKIRIZA NGA OMAZE OKUTEGEZEBWA/OKUNNYONNYOLWA, OKUTAMBUZA N'OKUTEREKA EBIGGYIDDWAKO OLW'OKUNOONYEREZA N'OKUSOBOZESA ABATUUZE B'OMUKITUNDU OKWENYIGIRAMU.

BW'OBERA NGA WANDIYAGADDE OKUMANYA EBISINGA EBITUKWATA KO, GENDA KU MIKUTU GY'EMPULIZIGANYA FACEBOOK, TWITTER,

-  GENOMEADVENTURES.WEEBLY.COM
-  FACEBOOK.COM/GENOMEADVENTURES
-  TWITTER.COM/GENOMEADVENTURE
-  PINTEREST.COM/GENOMEADVENTURE

Abaasobozesa omulimu

wellcome trust & NIH