

Vifaa vya kufundishia Mwendo wa Nyota, Jua na Mwezi

Stellar, solar and lunar demonstrators

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CLEA, Ufaransa



Malengo

Goals

- Kujifunza mwendo wa nyota jinsi unavyoonekana katika anga za latitudo tofauti
- Kujifunza mwendo wa Jua inisi unavyoonekana katika anga za latitudo tofauti
- Kujifunza mwendo na umbile la Mwezi jinsi unavyoonekana katika anga za latitudo tofauti
- Understand the apparent motions of stars as seen from different latitudes
- Understand the apparent motions of the Sun as seen from different latitudes
- Understand the Moon's movement and shapes as seen from different latitudes



Zoezi 1: Aridhio la nyota kuonesha:

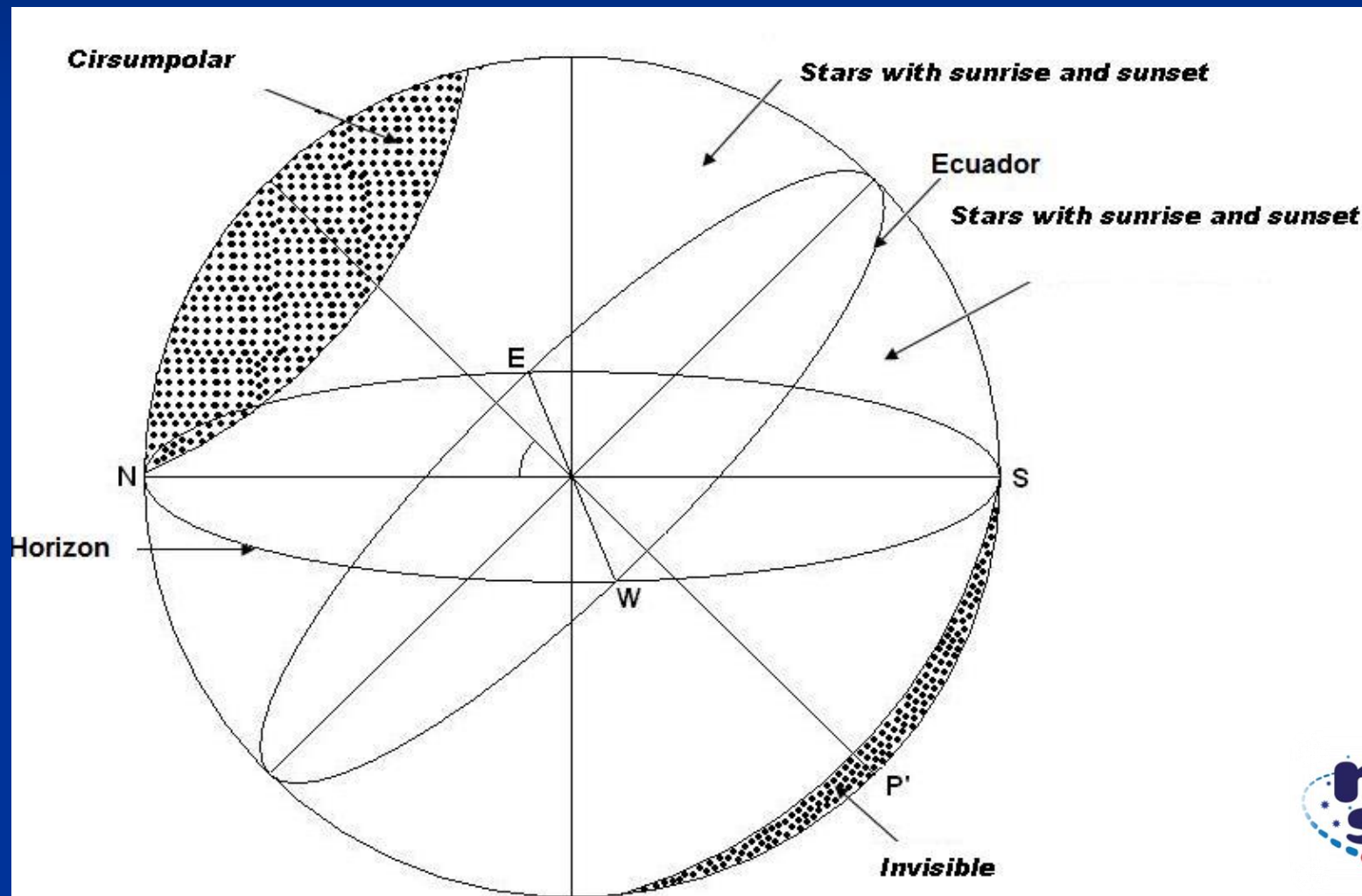
Activity 1: Stellar demonstrator for showing:

- Njia za nyota katika anga yetu
 - Nyota za kuzunguka Ncha, nyota zinazochomoza na kuzama, na nyota ambazo hazichomozi wala kuzama
 - Safiri mahali popote mradi unafahamu latitudo (Unaweza kutengeza kiigizio kwa kila mahali)
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- The paths of the stars in the sky
 - Circumpolar stars, stars that rise and set and stars that don't rise or set
 - Travel anywhere if you know the latitude
(You can build a simulator for each location)



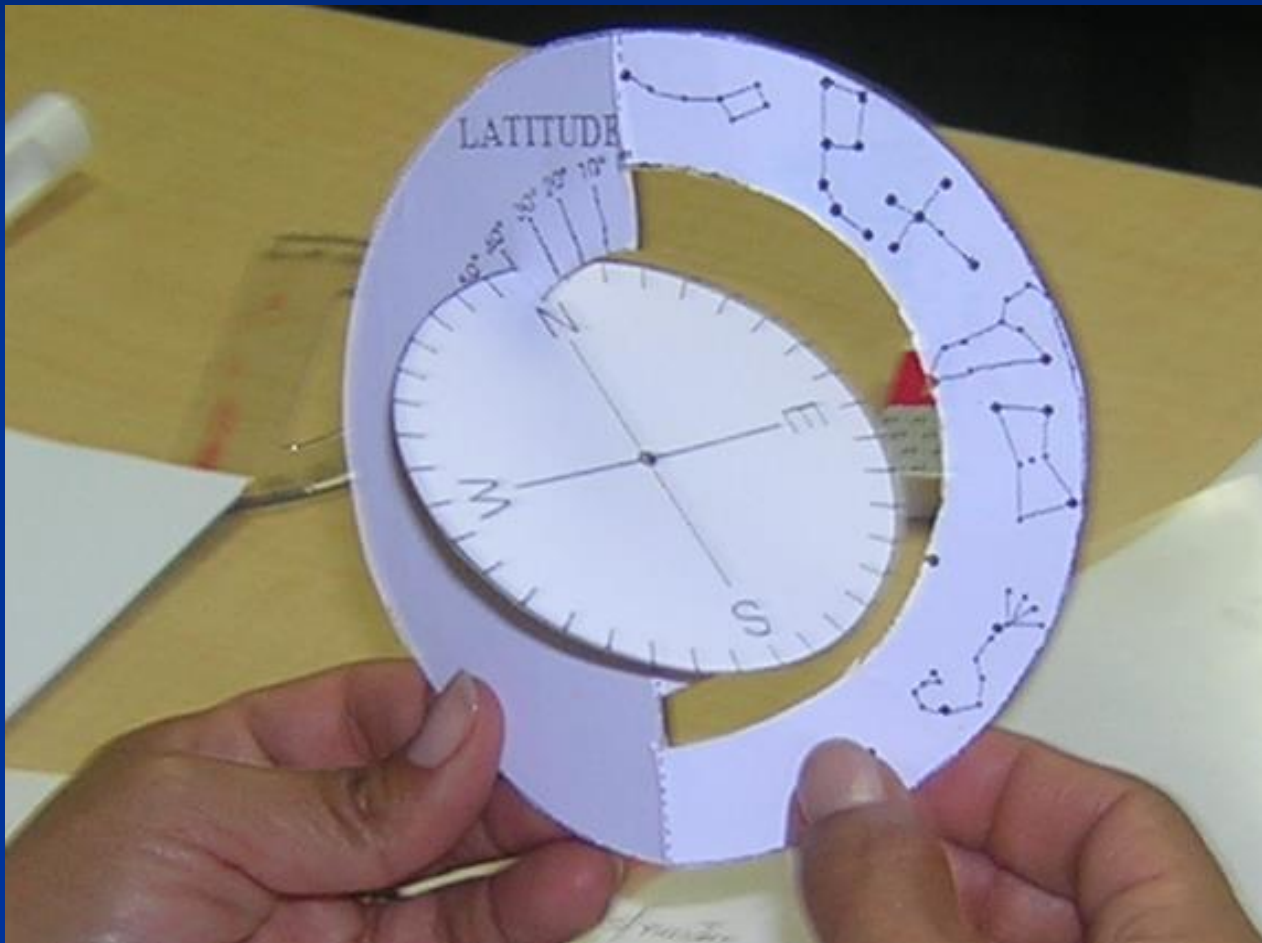
Nyota zakkuzunguka Ncha / nyota zinachomoza na kuzama / nyota ambazo hazichomozi wala kuzama

Circumpolar / stars that rise & set / stars that don't rise or set



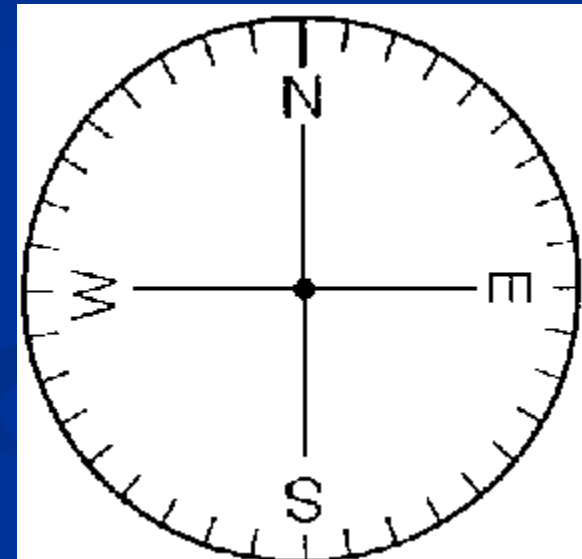
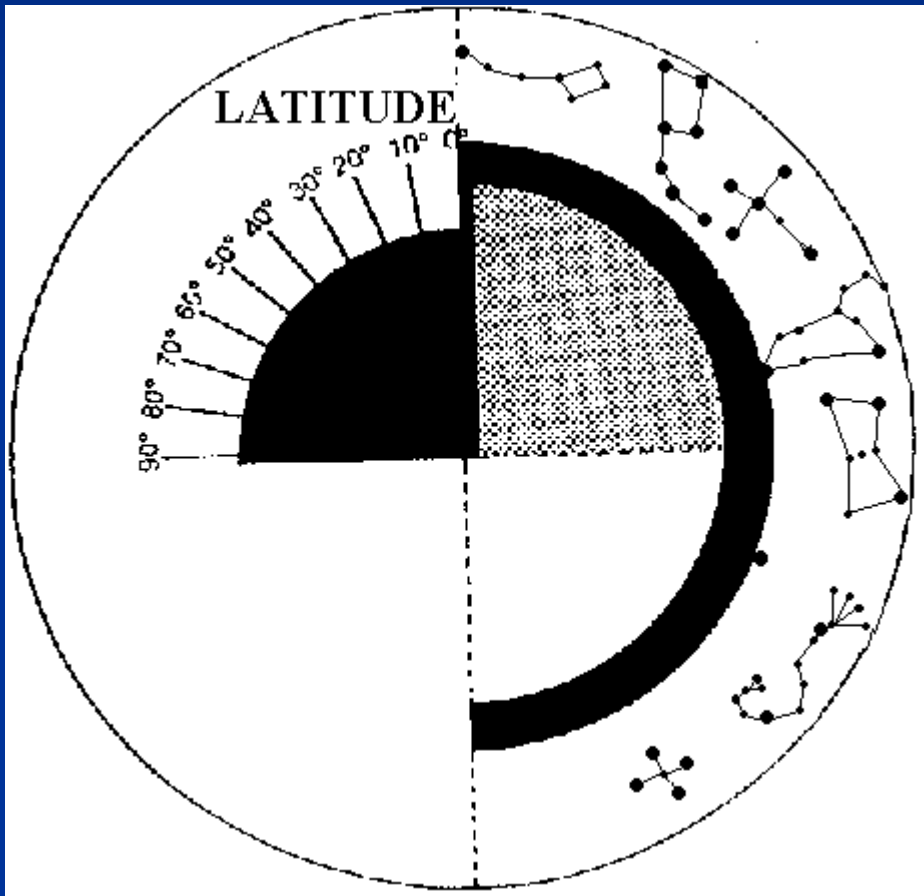
Kifaa cha Kuonesha Mwendo wa Nyota

Stellar Demonstrator



Kifaa cha kuonesha mwendo wa nyota kwa Nusutufe ya Kaskazini

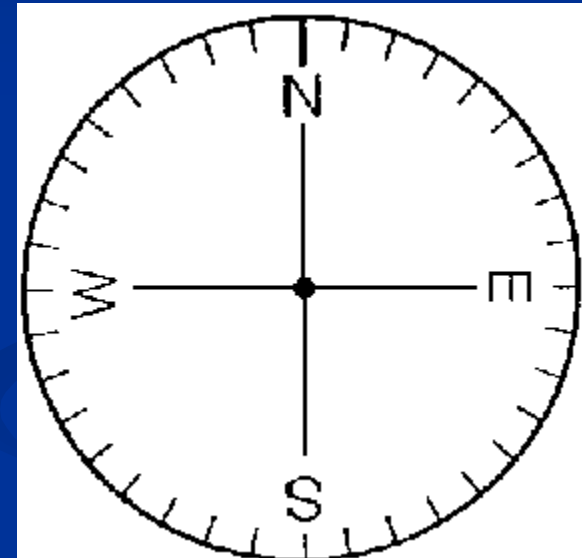
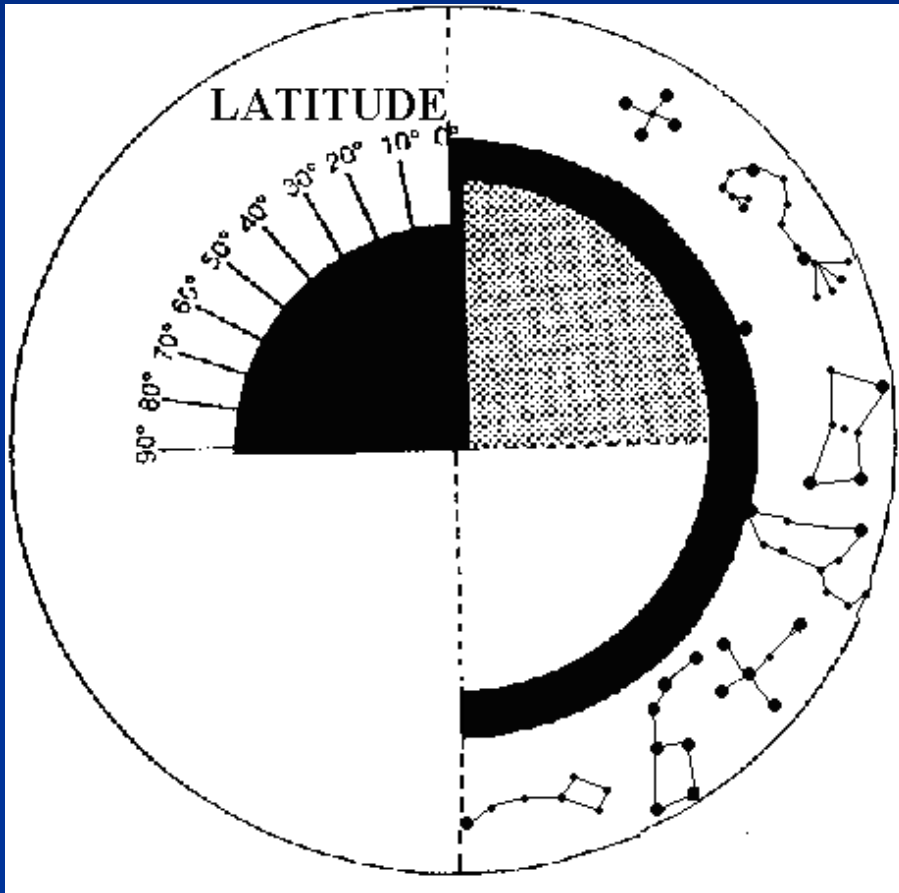
Stellar demonstrator for the Northern Hemisphere



Kifaa cha kuonesha mwendo wa nyota kwa

Nusutufe ya Kusini

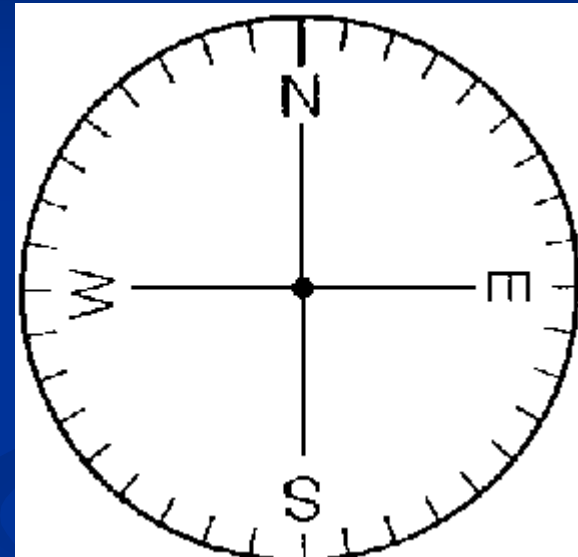
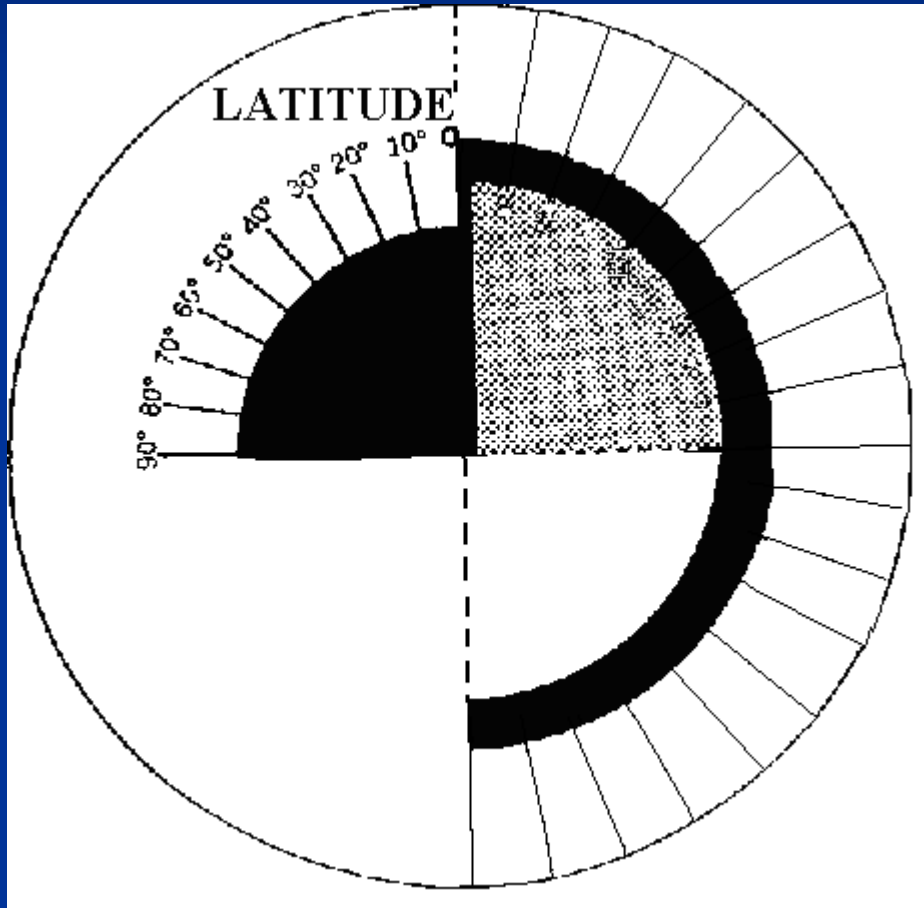
Stellar demonstrator for the
Southern Hemisphere



Kifaa tupu cha mwendo wa nyota

Blank stellar demonstrator

(add desired constellations)



- Msimu wa baridi
- Msimu wa mvua
- Msimu wa joto
- au kwa kila mwezi

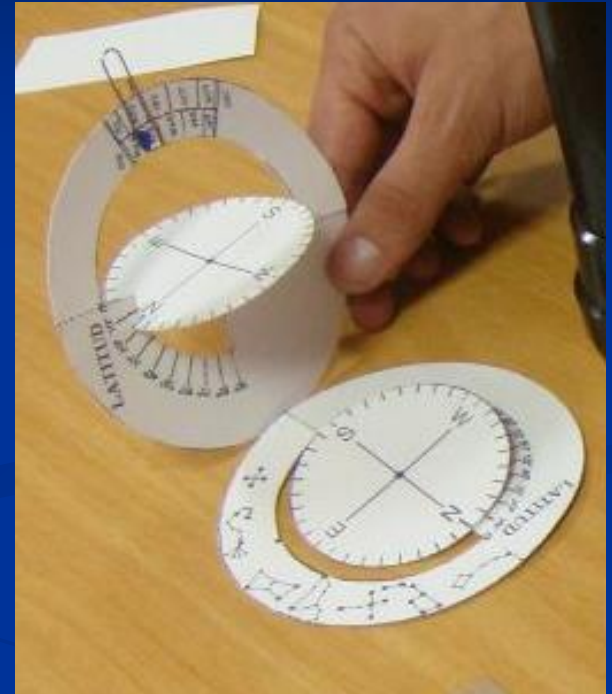
Spring, Summer, Autumn, Winter or each month



Kutengeneza kifaa

Construction

- Maelezo ya namna ya kutengeneza kifaa yanategemea eneo lako:
 - Nusutufe ya Kaskazini
 - *Nusutufe ya Kusini*
-
- The explanations given for construction depend on your location:
 - Northern hemisphere
 - *Southern hemisphere*



Maelekezo ya Utengenezaji-Hatua 1

Building instructions - Step 1

- Toa fotokopi kwenye karatasi ya manila ngumu na nzito
- Kata vipande vyote viwili (kikubwa na kidogo) kwenye mistarti kamili
- Ondoa maeneo meusi
- Pinda kipande kikubwa kwenye mstari nukta
- Make a photocopy on heavy-weight paper
- Cut both pieces (the big one and the small one) along the continuous lines
- Remove the black areas
- Fold the main piece along the straight dotted line



Maelekezo ya Utengenezaji-Hatua 2



Building instructions - Step 2

- Kata pengo dogo juu ya "N" (Nusutufe ya Kaskazini) kwenye diski ya upeo *au "S" (Nusutufe ya Kusini) kwenye diski ya upeo*
- Bandika roboduara ya Kaskazini-Mashariki (Nusutufe ya Kaskazini) kwenye diski la upeo juu ya roboduara ya rangi kijivu la diski kuu. Herufi "W" inatakiwa iowane na latitudo nyuzi 90°
- *au roboduara ya Kusini-Magharibi (Nusutufe ya Kusini) kwenye diski la upeo juu ya roboduara ya rangi kijivu la diski kuu. Herufi "E" inatakiwa iowane na latitudo 90° .*
- Kuwa makini katika zoezi hili, kwa sababu usahihi wa kifaa unategemea uowanishi kamili wa sehemu hizo mbili
- Cut a small notch above the "N" (Northern hemisphere) in the horizon disk *or the "S" (Southern hemisphere) in the horizon disk*
- Glue the North-East quadrant (Northern hemisphere) of the horizon disk onto the grey quadrant of the main piece. The "W" point must match up with latitude 90°
or the South-West quadrant (Southern hemisphere) of the horizon disk onto the grey quadrant of the main piece. The "E" point must match up with latitude 90° .

Try to be careful in this operation because the accuracy of model depends on the correct alignment of the two parts.

Maelekezo ya Utengenezaji-Hatua 3

Building instructions - Step 3

- Ingiza pengo la "N" (Nusutufe ya Kaskazini) kwenye roboduara juu ya vipimo vya nyuzi za latitudo

au ingiza sehemu "S" (Nusutufe ya Kusini) kwenye roboduara juu ya vipimo vya nyuzi za latitudo.

- Shika diski ya upeo iwe wima kwa diski ya digree za latitudo
- Anza kutumia kifaa chako kwa kuiweka kwenye latitudo yoyote unayoitaka...

- Fit the incision "N" (Northern hemisphere) into the quadrant over the degrees of latitude

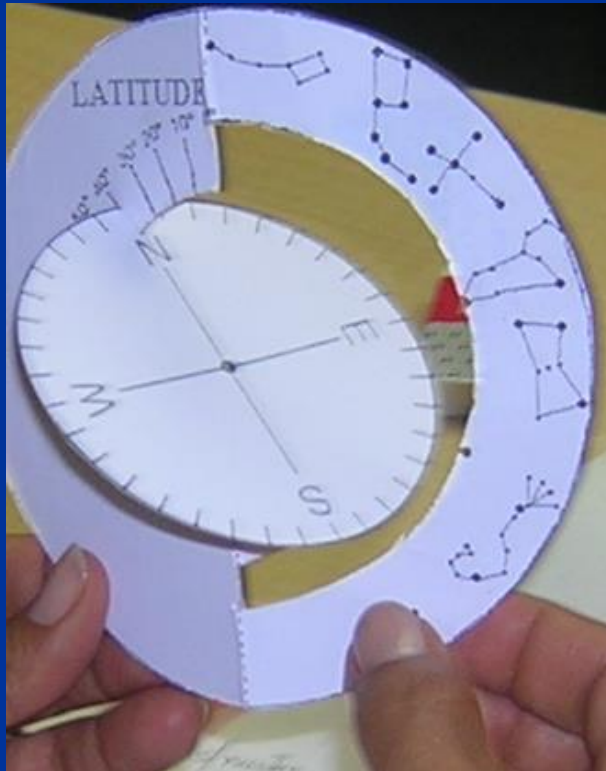
or the incision "S" (Southern hemisphere) in the quadrant over the degrees of latitude

- Hold the horizon disk perpendicular to the latitude degree disk
- Begin to use by setting it for any desired latitude...



Mwinamo wa njia za nyota

The tilts of stellar paths



Lat 70°
Enontekiö
(Ufini)
Finland



Lat 41°
Montseny
(Hispania)
Spain



Lat 23°
Matehuala
(Meksiko)
Mexico



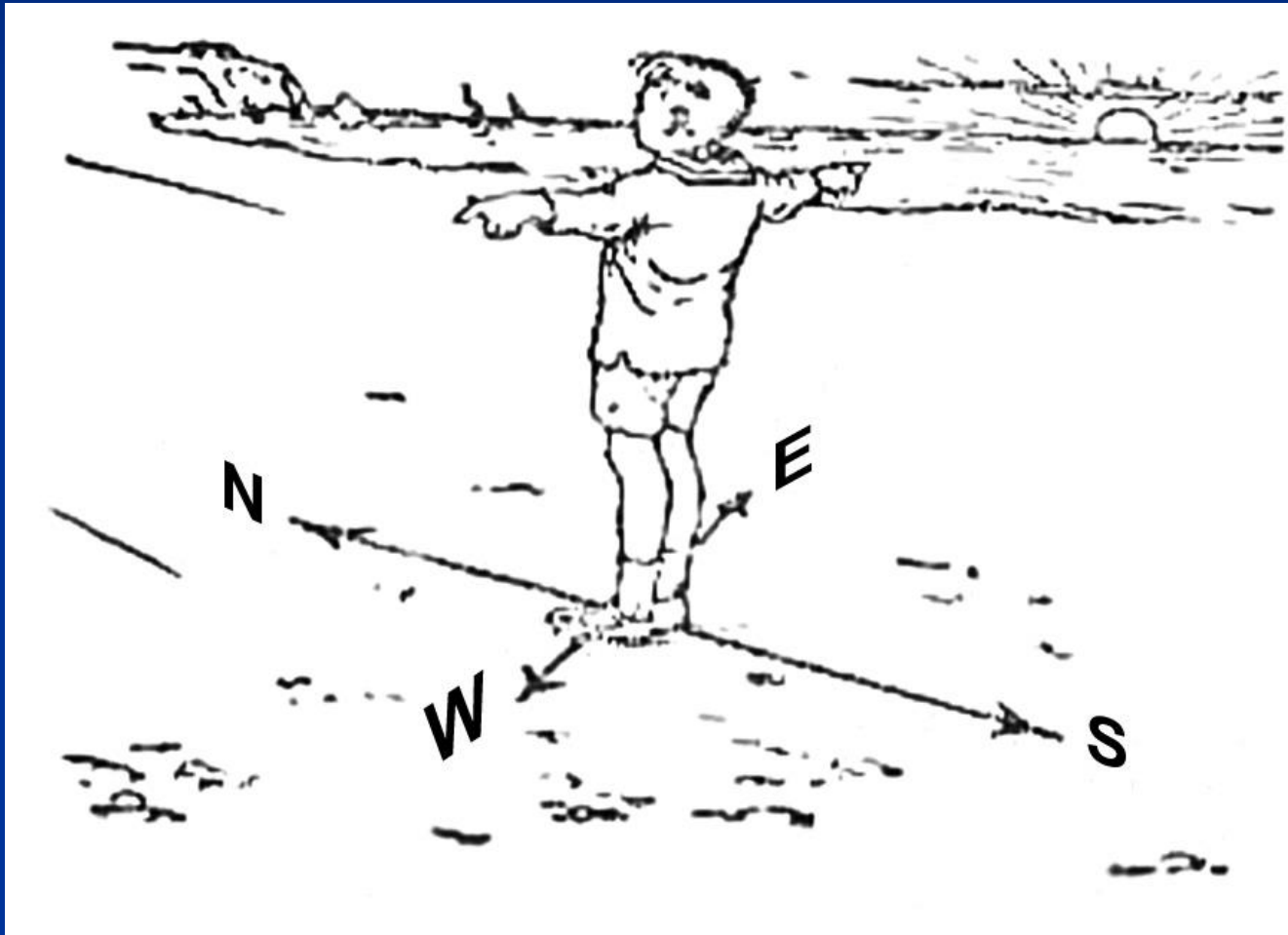
Jua huchomoza wapi?

Where is the sunrise?



Je, picha hii ni sahihi?

Is this picture correct?



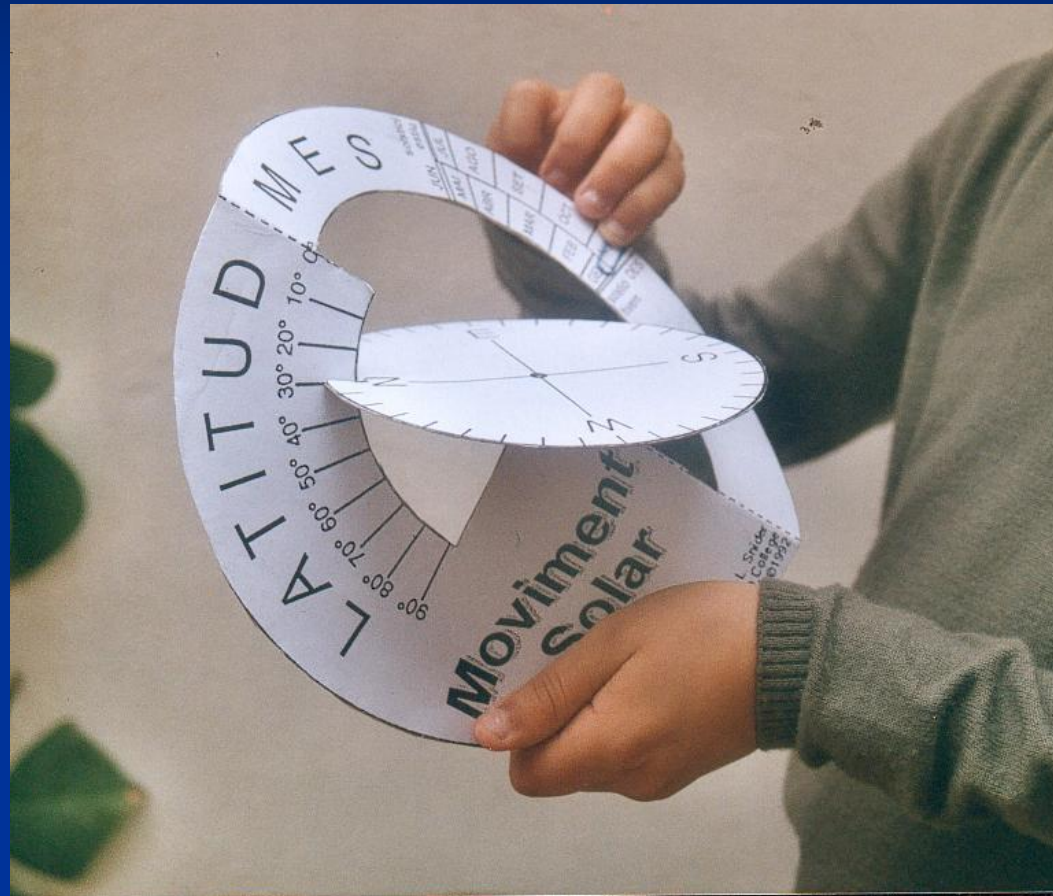
**“Jua huchomoza upeo wa Mashariki na huzama upeo
wa Magharibi”
Je, hii ni sahihi?**

The sunrise is always due East and the sunset is
always due West.
Is this correct?



...tutumie kifaa kingine

...with another demonstrator



Shughuli 2: Kifaa cha Mwendo wa Jua kwa ajili ya kuonesha:

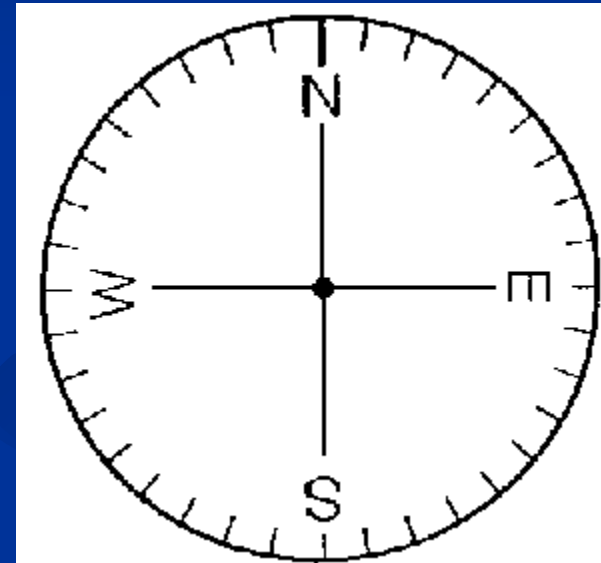
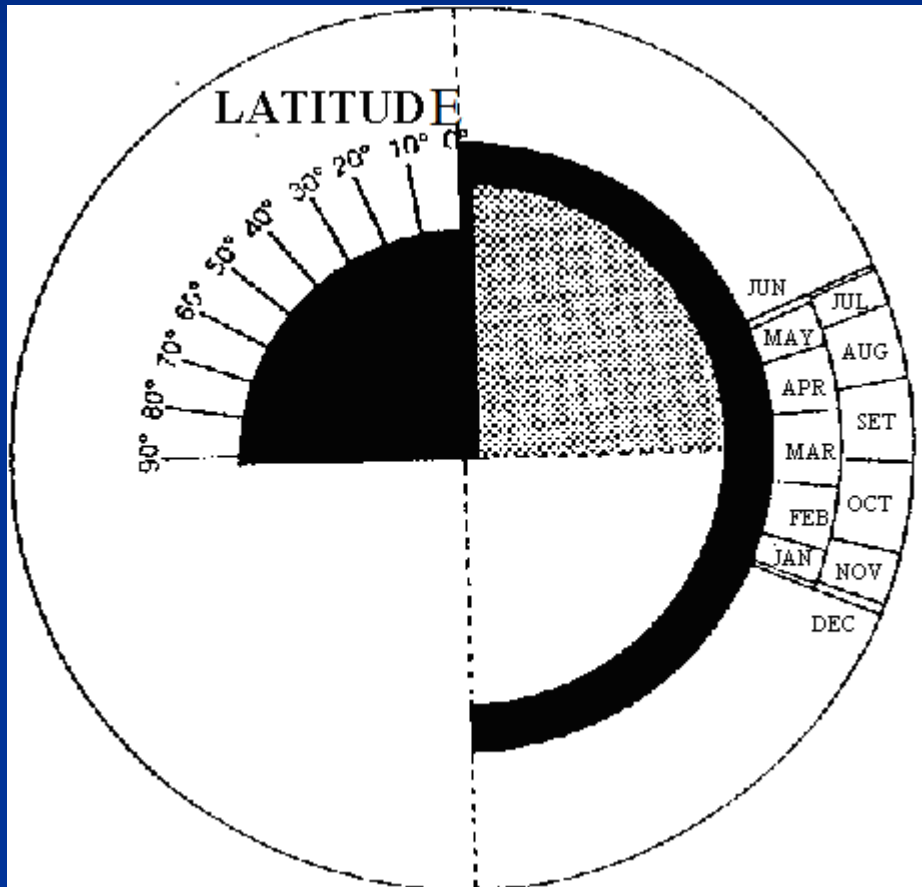
Activity 2: Solar demonstrator for showing:

- Njia ya jua wakati wa mchana
 - Mwendo wa Jua kwa mwaka
 - Kutafiti namna Jua linachomoza na kuzama
 - Jua la usiku wa manane
 - Kusafiri mahali popote ikiwa unajua latitudo
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- Daytime solar path
 - Annual motion of the Sun
 - Study risings and settings
 - Midnight Sun
 - Travel anywhere if you know the latitude



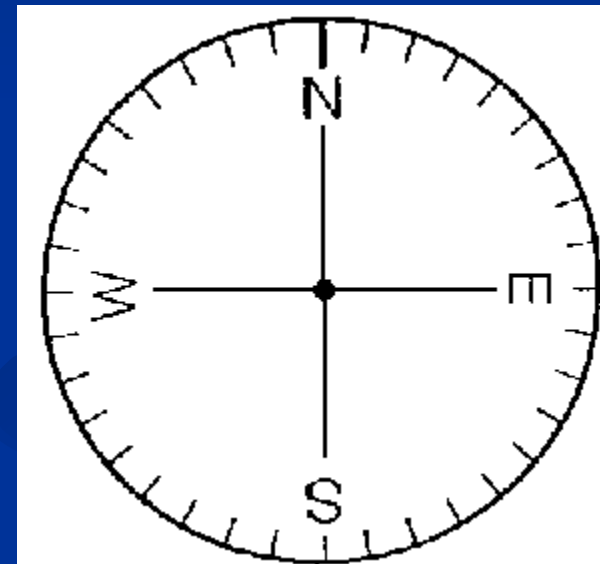
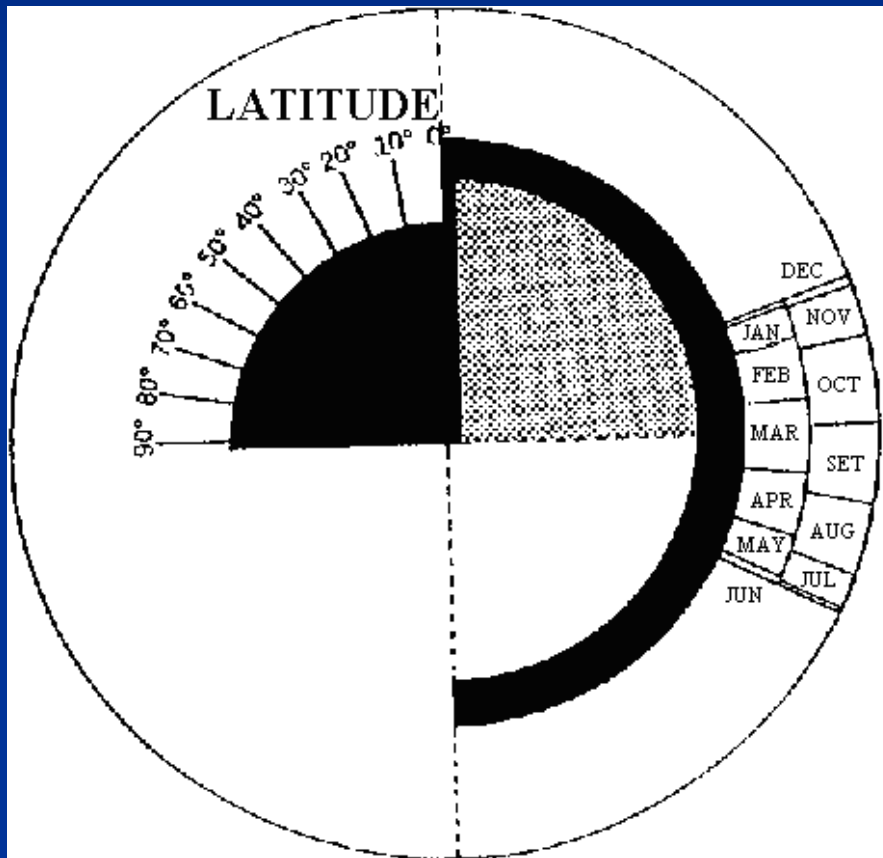
Kifaa cha Mwendo wa Jua- Nusutufe ya Kaskazini

Solar demonstrator - Northern hemisphere

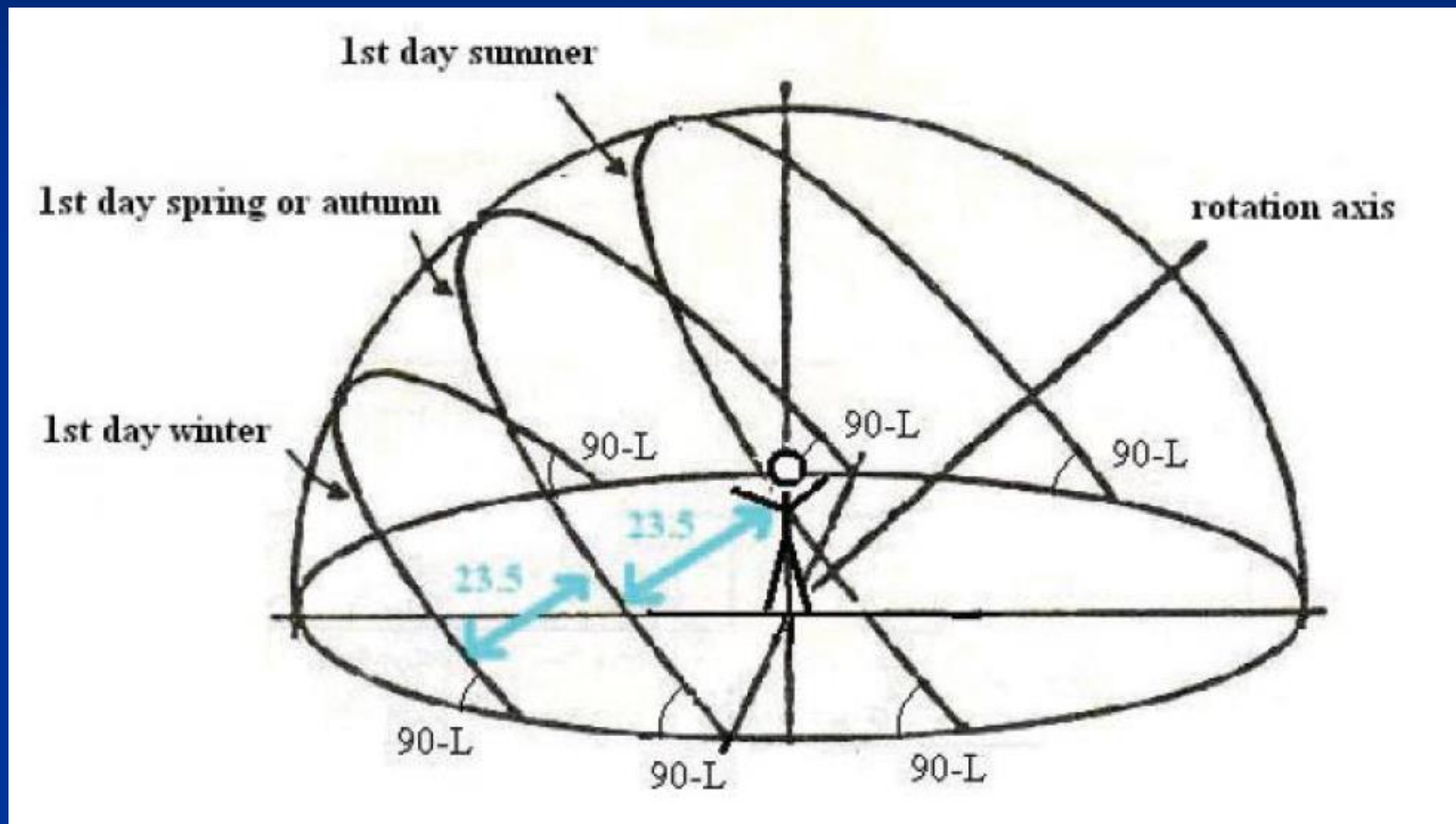


Kifaa cha Mwendo wa Jua- Nusutufe ya Kusini

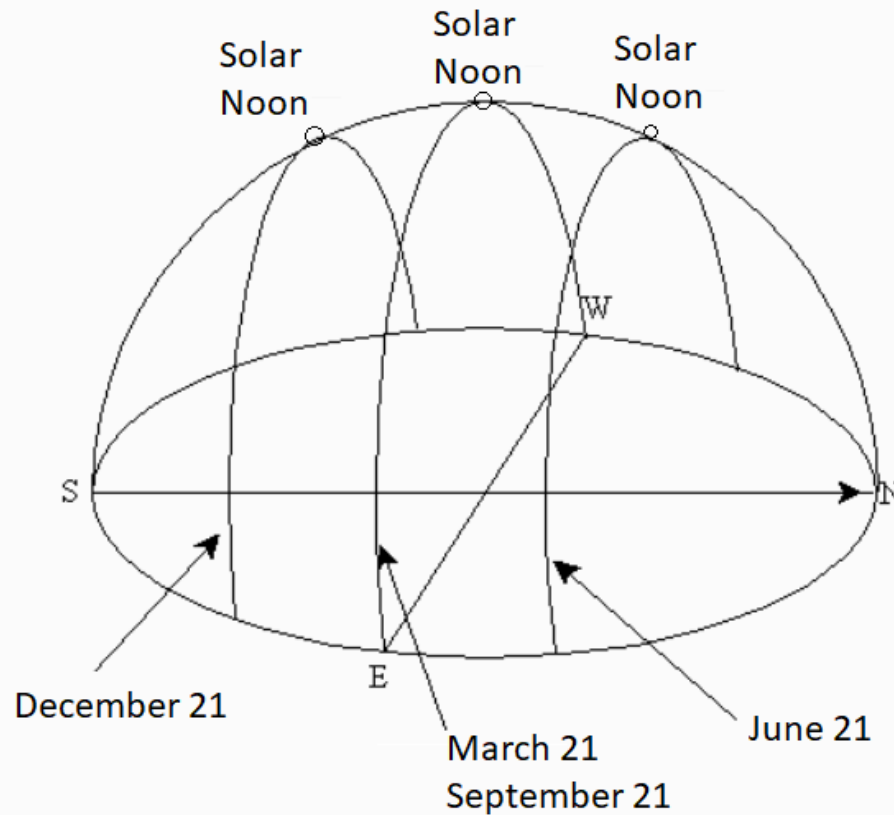
Solar demonstrator - Southern hemisphere



Njia za Jua Sehemu za Kusini au Kaskazini

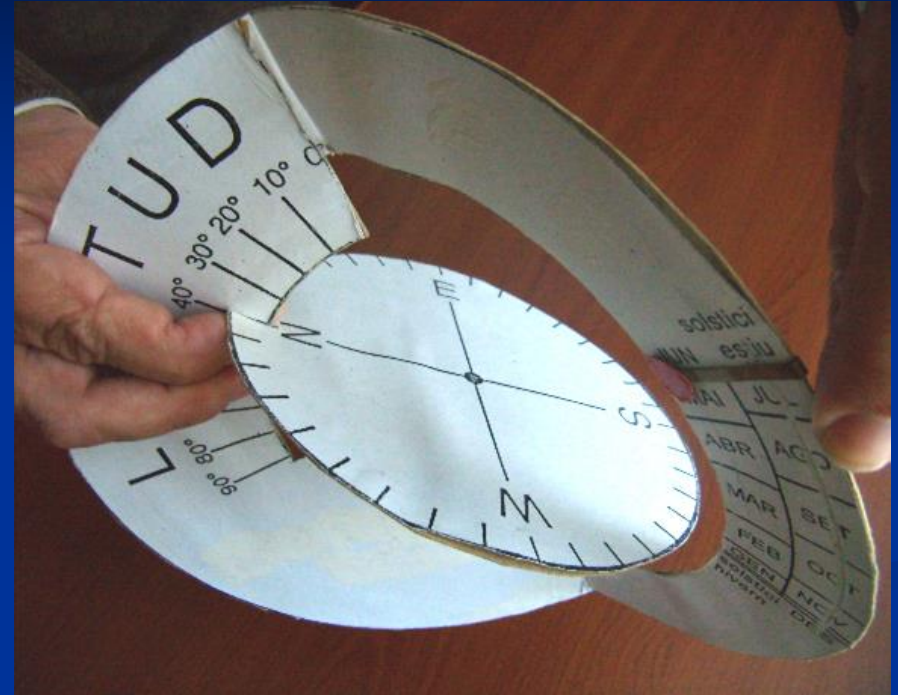
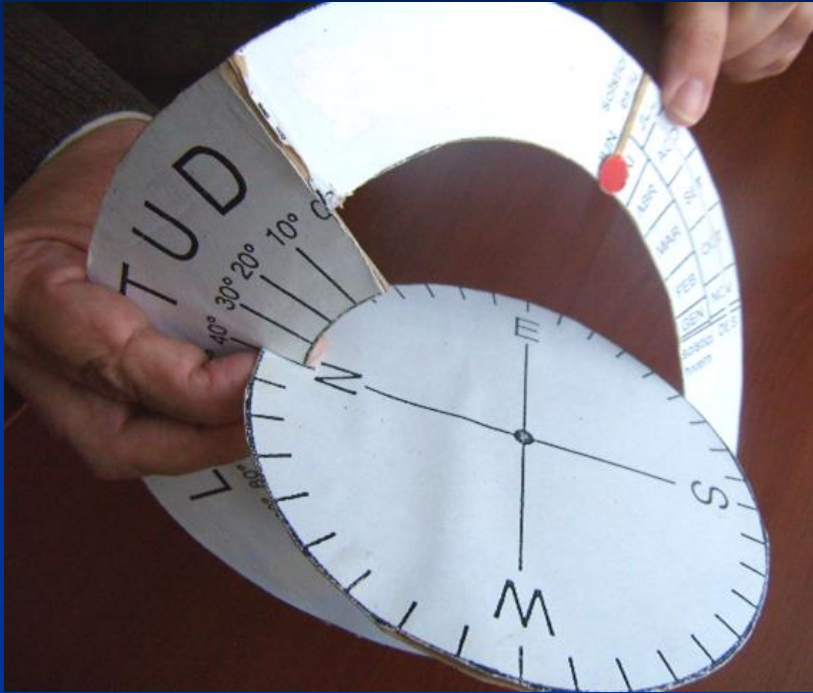


Njia za Jua Meneo ya Ikweta



Njia ya Jua

The Sun's path



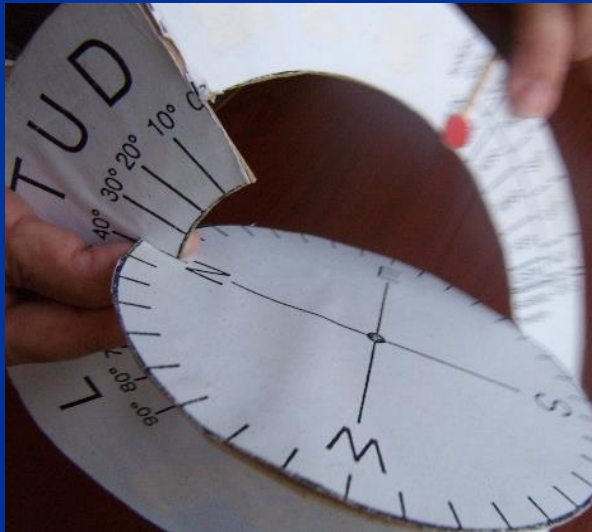
- Weka "N" iowane na latitude sahihi
- Weka alama kwa tarehe inayohitajika
- Tembeza 'mkono' wa tarehe kuonyesha njia ya Jua kwa mchana mzima
- Kumbuka mahali ambako Jua linachomoza na kuzama

- Place "N" at proper latitude
- Place the marker at required date
- Move date "arm" to show Sun's path through a day
- Note the positions of Sunrise and Sunset

Mwinamo wa njia

ya Jua

Slope of the Sun's path



Lat 70°
Enontekiö
Finland



Lat 40°
Gandía
Spain



Lat 5°
Ladrilleros
Colombia



Kimo cha Njia ya Jua

Height of the Solar path



Msimu wa Joto na Msimu wa Baridi huko Norway
Summer and Winter in Norway



Michomozo na Mizamo ya Jua katika maeneo tofauti

Sunrises and Sunsets in different places



57° Riga, Latvia



40° Barcelona, Hispania



2° Popayán, Colombia

winter



msimu
wa baridi

spring autumn



msimu
wa
masika



msimu
wa joto

summer



Michomozo na Mizamo ya Jua katika maeneo tofauti

Sunrises and Sunsets in different places



2 ° Popayán, Colombia



- 19° La Paz, Bolivia



- 43° Esquel, Argentina

msimu
wa baridi



msimu
wa
masika

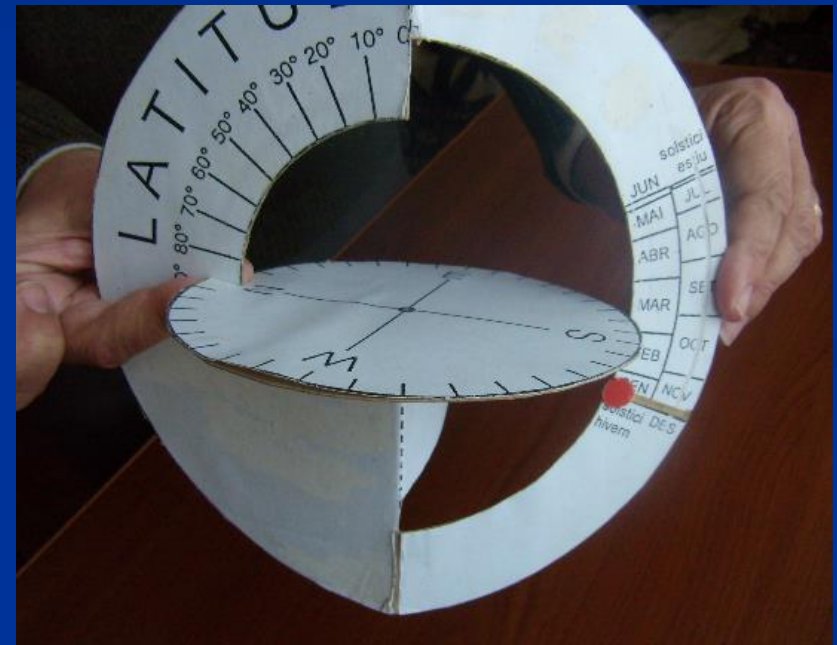
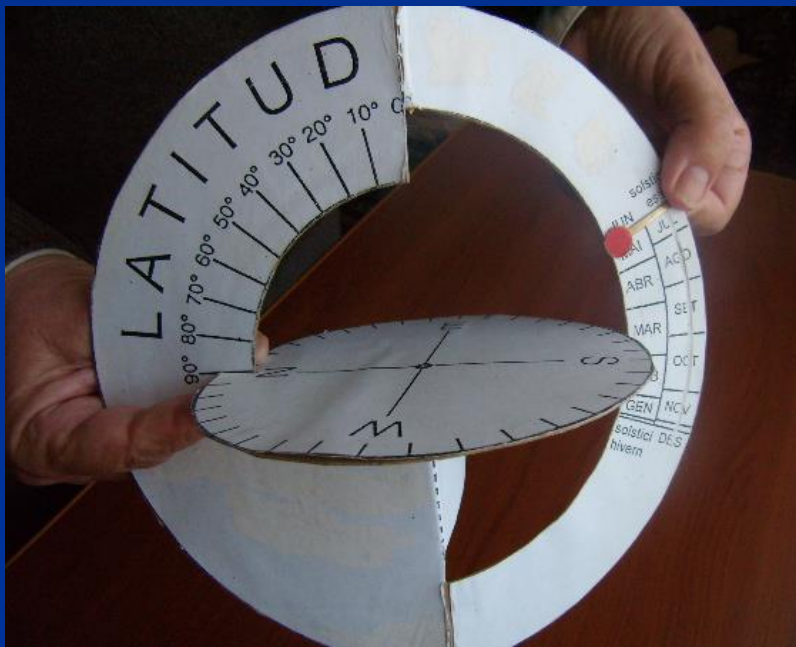


msimu
wa joto



Misimu ya joto na baridi kwenye ncha za Dunia

Polar summer and winter



Kwenye Ncha za Dunia, Jua linakuwa juu ya upeo kwa nusu mwaka na chini ya upeo kwa nusu ya pili.

At the poles, the sun is above the horizon for half a year and below it for half a year.



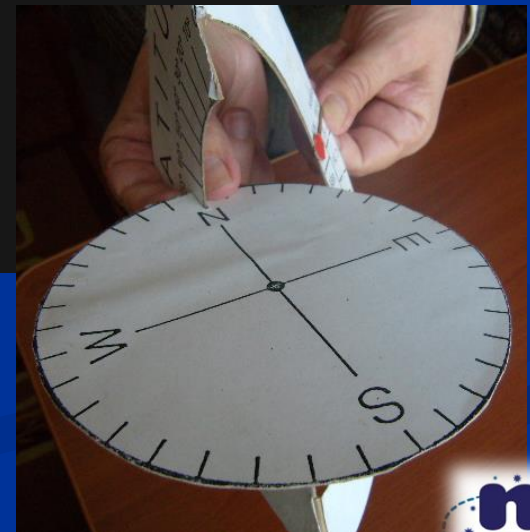
Jua la Usiku wa Manane

Midnight Sun



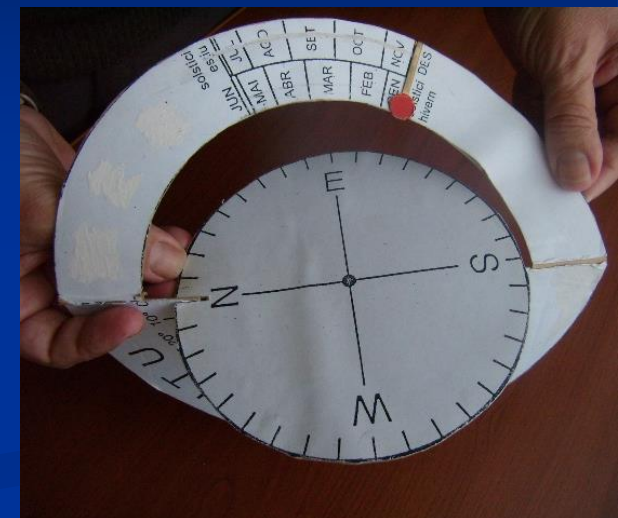
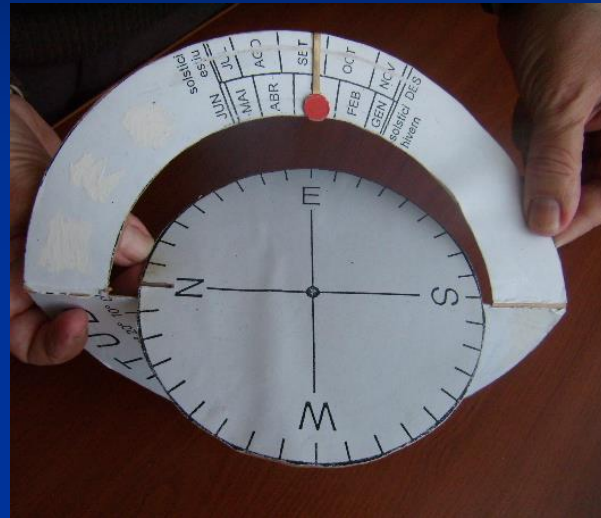
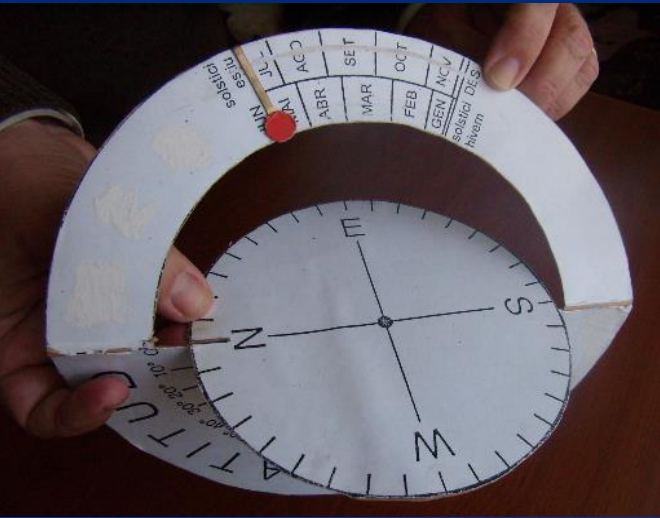
Jua huzama mpaka lipite meridi na halafu huanza kupanda tena badala ya kuzama chini ya upeo.

The Sun goes down until it passes the meridian and then begins to rise rather than set below the horizon.



“Misimu katika Ikwet”

“Seasons at the equator”



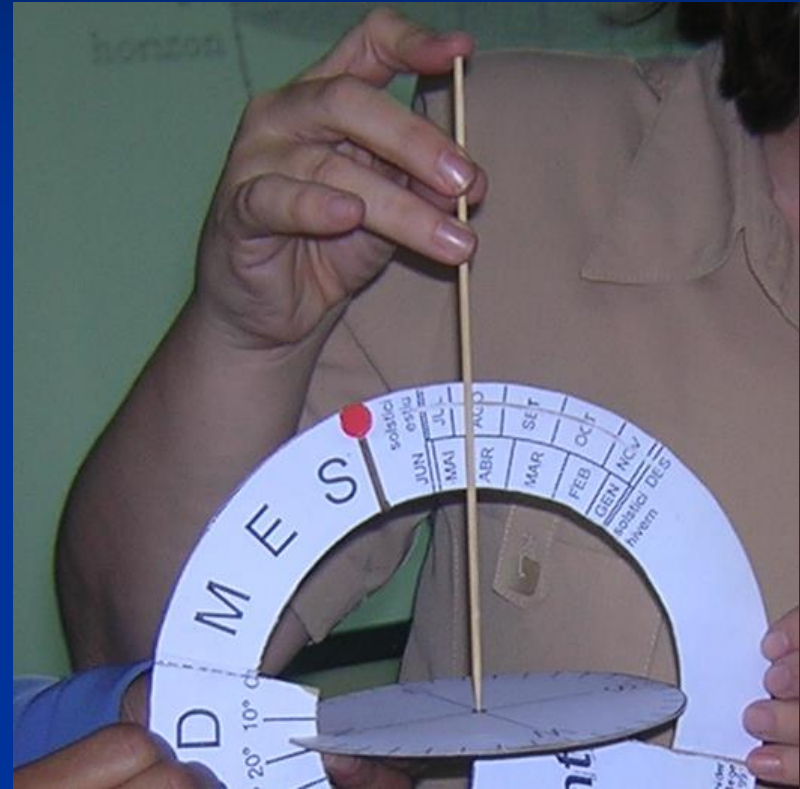
Njia ya jua inakaribia kuwa wima upeoni, na muda wake kuwa angani wakati wa mchana ni sawa mwaka mzima

The solar path is always almost perpendicular to the horizon and its length is almost the same throughout the year.



Jua la Utosini

Sun at the Zenith



Kwa Jua la adhuhuri, kivuli chako kinakuwa miguuni

At Solar Noon, your shadow is on your feet.



Zoezi 3: Kifaa cha kueleza Mwendo wa Mwezi

Activity 3: Lunar demonstrator

- Kwa nini Mwezi huwa na sura ya katika maeneo fulani?
- Why does the Moon smile in some places?



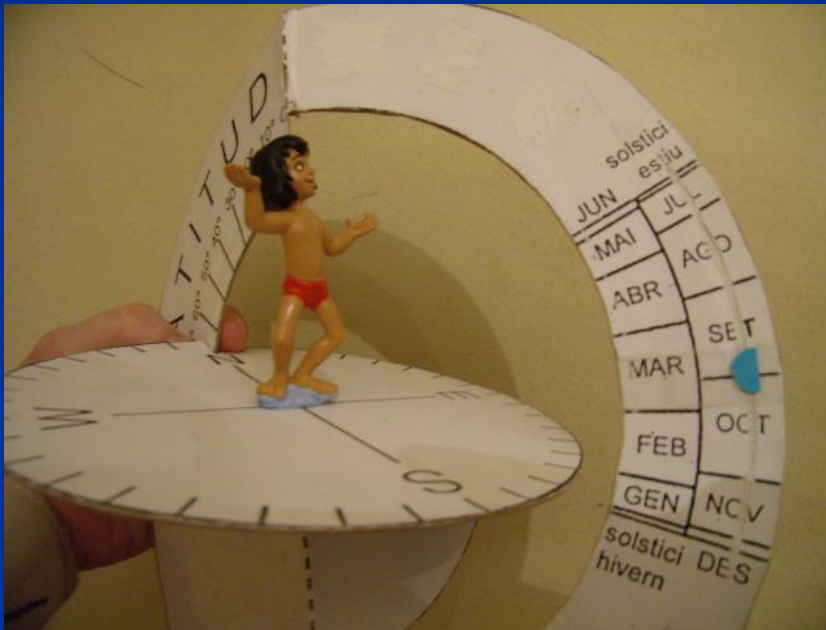
Kwa nini? ... sawa au hapana....

Why - yes or no....



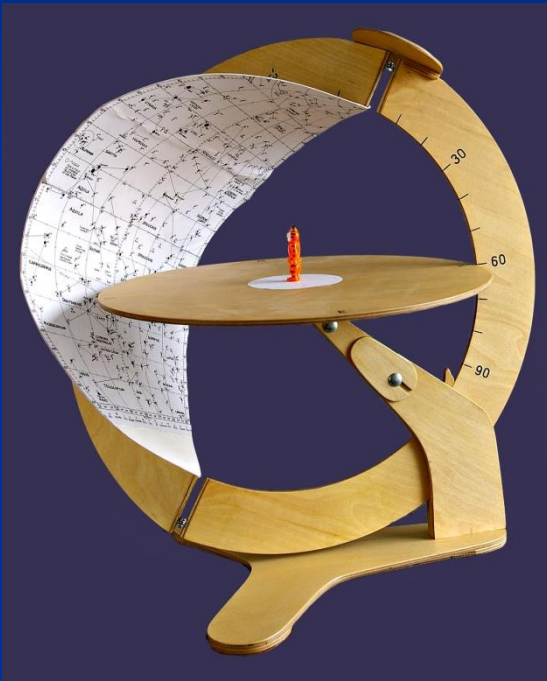
Zoezi 3: Kifaa cha kuelekeza Mwendo wa Mwezi

Activity 3: Lunar demonstrator



Vifaa vya saizi kubwa vya kuelekeza miendo

XXL demonstrators



**Asanteni sana
kwa usikivu
wenu.**

**Thank you very much
for your attention!**

