



Education Project

Joto la Sola Kupika

KITABU CHA KAZI

RASILIMALI YA MAFUNZO
CREATED AND COMPILED BY
Solar Education Project, GDS

Taarifa ya Ujumbe

Mradi wa Elimu ya Jua unafanya kazi kukuza jiko la jua kama zana za elimu, afya,
uwezeshaji wa kiuchumi, na ufufuaji wa mfumo ikolojia.

Timu ya Mradi wa Elimu ya Jua

Sisi ni bora pamoja.



"Nishati kubwa inatiririka kila wakati duniani kutoka kwa jua. Kupika kwa kutumia mwanga wa jua hutusaidia kupata zawadi hii tele. Tunaposhiriki kupikia kwa kutumia jua na wengine, tunashiriki zawadi ya mwanga wajua."

Mary Buchenic, Mwanzilishi Mwenza wa SEP



"Kupika kwa jua hunipa chaguo kila siku ya jua. Chaguo la kujitolea kupika kwa nishati mbadala isiyolipishwa ya jua na kuungana na watu kwa kushiriki chakula, utamaduni na jumuiya yetu. Manufaa ya kimataifa ni pamoja na kuboreshwa kwa usawa wa kijinsia, afya na ustawi, fursa mpya za biashara na kuendelea kukuza elimu ya STEM kwa kutumia tanuri (oven) za jua."

Jennifer Gasser, Mwanzilishi Mwenza wa SEP



"Uhifadhi wa Jua na Joto umekuwa na athari kubwa katika maisha yangu kwa sababu ni rahisikupika, kusafisha, salama na rahisi kutumia. Upikaji wa jua umenifanya ni thamini asili na riziki ya Mungu ya jua. Ninataka watu wajue kuwa kupika kwa kutumia jua ni suluhisho la nishati safi na bure. Mapishi ya kupika kwa kutumia jua na yakuhifadhi joto yamekuwa washirika wangu wa nyumbani."

Grace Chepkemei, Mshirika wa SEP nchini Kenya



Tafsiri ya kitabu hiki cha kazi ilikamilishwa kupitia kazi nzuri ya pamoja! Hii inathibitisha kwa mara nyingine kwamba sisi ni bora pamoja! Asante kwa Kamati ya Uendeshaji ya Warsha ya St Joseph Solar na Retained Heat kwa kufanya kazi na Mradi wa Elimu ya Jua ili kutoa tafsiri bora zaidi ya Kiswahili iwezekanayo kwa kitabu cha mazoezi. Ni matumaini yetu kuwa maelezo haya sasa yatakuwa muhimu kwa ajili ya kukuza upikaji wa nishati ya jua na joto lililobaki katika jumuiya nyingine nyingi.

Kitabu hiki cha kazi ni cha _____

Karibu katika jumuiya ya wapishi wa jua.

GDSnonprofit.org

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SESSION ONE

PART 1 BASELINE SURVEY

For Organization Distributing the Cooker(s) to Answer:

Date _____ City, Country Latitude and Longitude coordinates? _____

Name of Organization(s) Providing Solar Cooker _____

What type of solar cooker is being distributed?

Panel Box Evacuated Tube Parabolic Other _____

Is training being provided on use of cooker? YES NO

If YES, please indicate length of training _____

For Training Participant/Cook to Answer:

Name or Identification number: _____

What are the top 3 fuels you use? Please put 1 next to the most used, 2 next to occasional use, and 3 next to the least used. **Circle *all* of the fuels you use.**

___Charcoal	___Electricity	___Petroleum
___Crop waste	___Natural Gas	___Coal
___Dung	___Biogas	___BioMass
___LPG (Liquefied Gas)	___Solar Thermal	___Wood
___Fireless Cooker Basket	___Kerosene	___Other _____

How do you obtain your primary fuel? _____

List the fuels you use that you *do NOT pay cash money for*? Next to each fuel listed, estimate the quantity you use per week. (kilograms or other appropriate measure)

List the fuels you use that you *do pay cash money for*? Use kilograms or other appropriate quantifier. List each type and quantity.

How much money do you spend on fuel per week? (Identify currency.) _____

SESSION ONE

SOMO LENYE MAUDHUI

DARE

SEP iliunda kifupi DARE ili kusaidia kuelezea mchakato wa kupikia kwa jua.

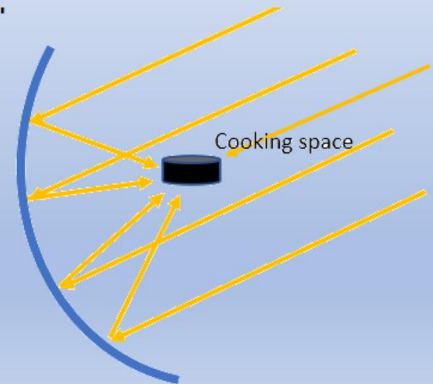
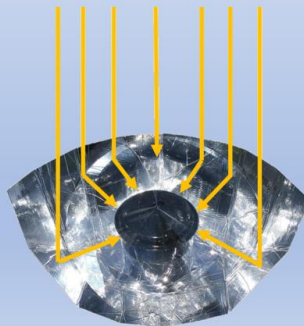
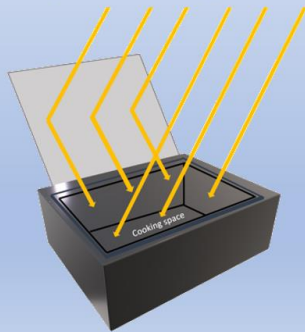
Kila herufi ya DARE inasimama kwa hatua muhimu kwa mafanikio ya kupikia jua. Fuata hatua za DARE na hivi karibuni utapika na jua. Utakuwa sehemu ya mtandao mkubwa wa kimataifa wa watu wanaotumia teknolojia hii ya kupikia bila malipo, isiyotoa hewa chafu.



D.A.R.E.

Direct (Ifanye iende katika mwelekeo.)

Tanuri ya uso kuelekea jua. Rekebisha sehemu moja au zaidi ya kuakisi ili kuelekeza mwanga wa ziada wa jua kwenye eneo la kupikia. Eneo la kutafakari zaidi, nishati ya mwanga zaidi utakamata.



D.A.R.E.

Absorb (kunyonya)

Tumia rangi nyeusi kunyonya urefu wote wa mawimbi ya mwanga unaoonekana na kubadilisha nishati ya mwanga kuwa nishati ya joto. Mambo ya ndani ya tanuri ya sanduku inaweza kuwa nyeusi. Sufuria ya kupikia inapaswa kuwa nyeusi. Nyembamba, sufuria za kupikia nyeusi zilizofanywa kwa chuma au kauri hufanya kazi vizuri na oveni za sanduku na paneli.



SESSION ONE



D.A.R.E.

Retain (Mtego)

Weka joto ndani ya nafasi ya kupikia kwa kuifunga. Tumia mifuko ya oveni, mikono ya polycarbonate, vifuniko, vifuniko vya bakuli vya pyrex na insulation. Weka mfuniko mkali kwenye sufuria yako ya kupikia. Kwa kuhifadhi joto, unaweza kupika chakula!



D.A.R.E.

Eat (Kula)

Kula chakula chenye afya na lishe kilichopikwa kwa nishati safi zaidi - jua!



Unaweza kusema sehemu zote za DARE? Acha mtu arekodi kikundi akielezea DARE.

SESSION ONE

LEARN ABOUT YOUR SOLAR OVEN

Haines 1 Large “Pop open” Design:

Folds flat and “pops open” ready for use.

Brick on flap keeps cooker steady in wind.

Reflector and circular cover are die-cut.

Manufacture in-country requires only taping

two reflector seams and attaching small velcro strips to the circular cover and the reflector.



Cooks 50% faster than the original Haines 1.

“Stacked” cooking pot. A solar cooker is more likely to be used if it can cook multiple foods at the same time. The Haines Pop open oven can cook with a single pot or with stacked pots.



Stacked pots can cook multiple dishes at once.

“Stacking” is possible because solar cookers reflect sun’s light onto top and sides of the pan, not just the bottom.



After cooking, the food can be kept hot for 4-6 hours for the evening meal by placing the pot in a **heat-retention basket**.

Notes: _____

SESSION ONE

MAHUSIANO YA KIMATAIFA

Ni Wapi Duniani?

Kutana na Roger kutoka Marekani - Mwanasheria Msaidizi Mstaafu wa Marekani na Mkurugenzi Mtendaji wa Haines Solar Cookers, LLC

Roger ni Mwanasheria Msaidizi wa Marekani aliyestaafu na Mkurugenzi Mtendaji wa sasa wa Haines Solar Cookers, LLC. Anaishi Marekani, nchi iliyoko Amerika Kaskazini. Majimbo hayo yanayopakana yanapakana na nchi mbili, bahari mbili, na Ghuba ya Mexico. California iko kwenye pwani ya magharibi kando ya Bahari ya Pasifiki.



Fred Rogers' kanuni tatu za mafanikio: Kuwa mwema. Kuwa mwema. Kuwa mwema.
How does Roger show kindness in the world?



Mnamo mwaka wa 2012, Roger aligundua upishi wa jua kupitia mtetezi wa upishi wa jua, Pat Mcardle, na kwa kutumia Wiki ya Solar Cookers International. Kadiri alivyotafiti zaidi, ndivyo alifikiria zaidi kuwa kupikia kwa jua ni wazo nzuri katika kutafuta muundo bora. Kwa hivyo, aliamua kuunda muundo huo mwenyewe! Kwa uvumilivu, Roger aliunda kampuni iliyofanikiwa na inayozingatiwa sana ya jiko la jua. Zaidi ya tanuri 4,000 za sola za Haines zimeuzwa Marekani. Amefanya kazi na wengine kusambaza oveni 2,500 katika nchi zinazoendelea. Mnamo mwaka wa 2017, alisafiri hadi Kambi ya Wakimbizi ya Kakuma nchini Kenya kwa hafla ya kupikia kwa kutumia jua ambayo alisaidia kuandaa na kufadhili.

Roger anapenda kuwa huru kupika na mwanga wa jua tu. Amebarikiwa kuwa karibu na hali ya hewa nzuri ambapo anaishi Del Mar, California. Kwa kweli, anasema hainyeshi kamwe hadi baada ya jua kutua! Pamoja na hali ya hewa hiyo nzuri, Roger anafurahia kupikia nyingi za jua. Vyakula anavyovipenda vilivyopikwa kwa kutumia jua ni pilipili na mkate wa ndizi.

Roger amejitolea kueneza upishi wa jua duniani kote na anahudumu katika bodi za Solar Household Energy (SHE), Rotary klabu ya San Diego na Alliance for African.

Msaada. Kwa nini mtu atoe wakati mwingi kwa juhudi hii? Roger anasema ni muhimu kwa sababu inaokoa pesa, inapunguza kasi ya ukataji miti, inapunguza magonjwa ya mapafu, na inapunguza ongezeko la joto duniani. "Imenipa nafasi ya kukutana na watu wa ajabu na ninatumai kufanya mema ulimwenguni."

Utafiti wa kujua zaidi kuhusu hali ya hewa ya Del Mar, California nchini Marekani. Ni mara ngapi unaweza kupika kwa kutumia jua huko Del Mar, California

SESSION TWO

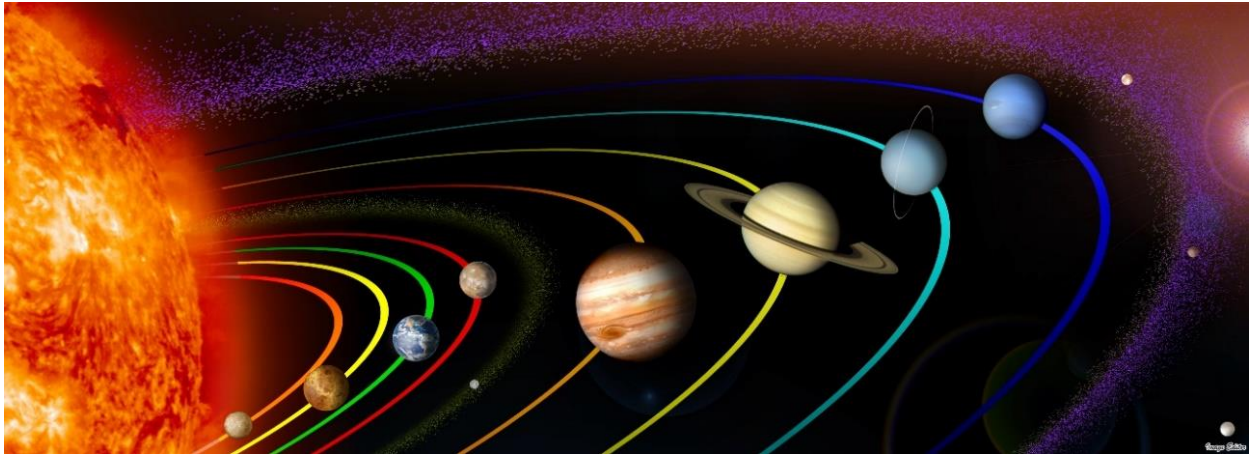
WELCOME

Je, una lengo gani leo? _____

SOMO LENYE MAUDHUI

JUA LETU LA AJABU

Jua ni nyota iliyo katikati ya mfumo wetu wajua. Sayari zote huzunguka, au obiti, kuzunguka jua.



Dunia ni sayari ya tatu kutoka kwa jua. Je, unaweza kutaja sayari nyingine yoyote?



Juani kali sana!

Kituo hicho kina nyuzi joto 15,500,000 Selsiasi (27,000,000° Fahrenheit).

Uso huo unahaliji joto yatakriban 5,500° Selsiasi (10,000° Fahrenheit).

Mwanga wa jua ni anai ya nishati yenye nguvu sana. Inaitwa nishatiya jua. Nyosha mkono wako nje umbali kutoka katikati ya kidevu chako hadi ncha ya mkono wako nikama mita moja.

Meta moja ya mraba ya jua inayopiga Dunia nisawa na Wati 1000. Ikiwa ungeweza kukamata nishati hiyo yote kwa saa moja, ingetosha kuwasha jokofu siku nzima. Lakini kukamata yote inaweza kuwa vigumu.

Kioo cha kukuza kinaonyesha jinsi jua lilivyo na nguvu. Kioo kilichopinda hufanya miale ya mwangawa jua kupinda. Miale huingatia sehemu moja. Doa inakuwa moto sana naita waka.

Ni shati ya jua ina nguvu! Ni bure!

Ni aina safi ya nishati!

Tunaweza kukamata nishati ya jua kupika chakula. Si vigumu kufanya. Siku yoyote ya jua, unaweza kutumia nishati hii ya ajabu kupika.

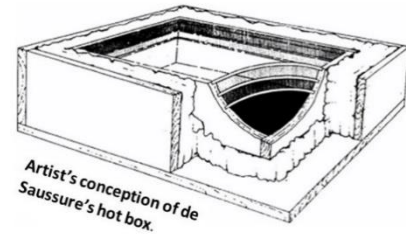


SESSION TWO

HISTORIA YA KUPIKA NA JUA

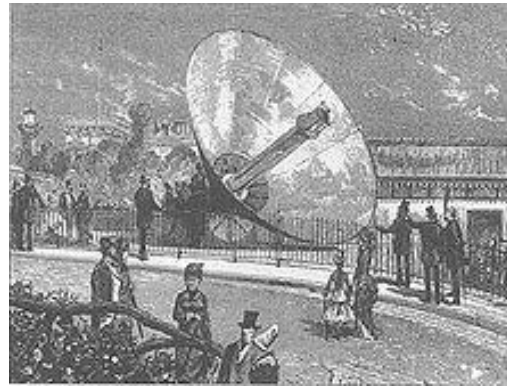
Yaliyopita

Zaidi ya miaka mia mbi hamsini (250) iliyopita, mwaka wa 1767, Horace de Saussure alikuwa akifanya majaribio na 'hot box'. Hiki ndicho jiko la kwanza linalo julikana la jiko la sola ama jua ku rekodiwa.



Zaidi yamiaka mia hamsini (150) iliyopita, mwaka wa 1869, Augustin Mouchot alitengeneza kifaa cha kukusanya nishati ya jua ambacho kilifanya kazi kama injini. Ilikuwana sura ya parabolic.

Artist's depiction of Mouchot's parabolic collector



Kifaa cha Mouchot kilitumiwa pia kama jiko. Katika Maonyesho ya Dunia huko Paris ilitumiwa kupika kilo moja yanyama ya Ng'ombe. Ilichukua dakika ishirini (20) tu.

Kuna ushahidi kwamba tanuri ya jua ya parabolic ilitumiwa na majeshi ya Ufaransa huko Afrika mwisho nimwa Karne ya kumi na tisa (19).

Mnamo mwaka wa elfu moja mia nane tisini na mbili (1892), James Dewar aliunda kifaa ambacho kili kuwa na maboksi ya kutosha. Kifaa chake kili kuwa chupa ndani ya chupa. Kati ya flasks mbili, molekuli za hewa zili ondolewa, na kuunda vacuum.

Joto huhitaji molekuli kwa mchaka to wa uhamishaji wa nishati kwa upitishaji. Utupu ulizuia joto kuingia au kutoka. Ikawa kizuio kamili. Thermos ya kisasa, inayo tumiwa kuweka maji ya moto au baridi, inategemea wazo hili. Hai kutumiwa kupika hadi mwanzo wa karne ya 21.



Sir James Dewar's evacuated tube 1892 <http://www.rigb.org/>

SESSION TWO

Kisasa

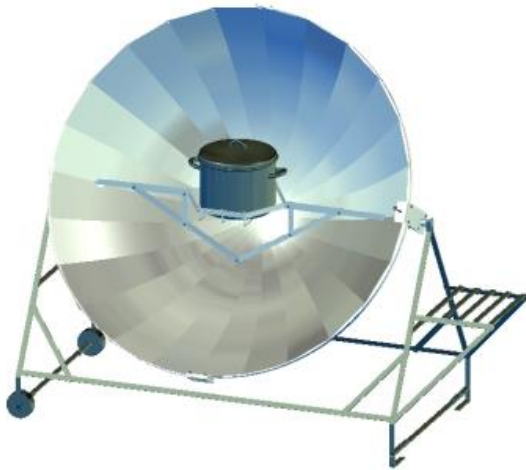
Wakati huu kuna miundo mingi tofauti ya vifaa vya tanuri ya jua: Sanduku, Paneli ya Kuakisi, Parabolic, na Bomba Iliyo hamishwa.

Tanuri za sanduku na Tanuri za Paneli za Kuakisi hupika kwa joto la katina la chini.

Mwangaza huelekezwa kwa nyenzo za uwazi kwenye nafasi ya kupikia. Katika nafasi ya kupikia, sufuria nyeusi na/au mambo ya ndani huchukua mwangaza. Mabadiliko ya mwangaza kwa nishati ya joto. Nishati ya joto haiwezi kutoroka.

Tanuri hizi zinaweza kupika vyakula mbalimbali katika hali ya joto salama.

Parabolic Burner (SK14)



All American Sun Oven
Box Cooker



Panel Oven (Haines 1)

Tanuri za parabolic hufanya kazi kama kupika juu ya moto.

Viakisi vikubwa vilivyo jipinda huelekeza miale mingi ya mwanga kwenye sehemu kuu.

Sufuria ya kupikia inachukua mwangaza.

Nishati nyepesi hubadilika kuwa nishati ya joto.

Jiko la jua la kimfano lina weza kufikia joto la juu.

Unaweza kaanga na kuchemsha vinywaji.

Tanuri za bomba (evacuated tube) hufanya kazi kama tanuri iliyo kwenye wastani au juu.

Tanuri hutengenezwa kwa tabaka mbili za kioo.

Nafasi kati ya tabaka ni tupu.

Mwanga huingia kupitia glasi ya nje.

Kioo cha ndani kina mipako nyeusi.

Mipako nyeusi inachukua mwanga.

Nishati nyepesi hubadilika kuwa nishati ya joto. Nishati ya joto imefungwa na nafasi ya utupu.

Tanuri za mirija hupata joto sana na hubaki moto sana. Waweza kuoka, kuchoma nyama ya kahawia, na kuchemsha maji.



Evacuated Tube Oven (GoSun)

Katika Wakati Ujao

Je, mustakabali wa muundo wa jiko la jua ni nini? Watu wengi zaidi wamegundua upishi wa jua. Miundo mipya inatengenezwa na wakati ujao unategemea sisi zote.

SESSION TWO

MAHUSIANO YA KIMATAIFA

Ni Wapi Duniani?

Kutanana Celestino kutoka Ureno – Mpishi wa jua na Profesa wa Uhandisi

Celestino ni profesa wauhandisi wamitambo katika Univers idade do Algarve huko Faro, Portugal. Ureno iko kwenye Peninsula ya Iberia katika sehemu ya kusini-magharibi ya Uropa. Ina mipaka na Uhispaniana Bahari ya Atlantiki.

Mnamo 2006, aliandamanana rafiki mzuri kwenye mkutano wa Kimataifa wa Solar Cookers katika Granada Uhispania. Aliondoka kwenye mkutano akiwa na jiko dogo la kuakisi linaloitwa CookIt. Alianza kuitumia kuandaa chakula kama wali na kuku. Ilikuwa tamu, lakini hakupenda kutumia mfuko wa plastiki wa tanuri kama mtego wa joto. Na alihitaji tanuri ambayo ingefanya kazi vizuri zaidi wakati jua likuwa chini kwenye upeo wa macho. Alinunua tanuri zaidi kama faneli na vichomaji viwili vya kimfano (parabolic). Baada ya hayo, juhudi zake za kupikia jua ziliongezeka zaidi.



Celestino husherehekea siku yake ya kuzaliwa kila Januari kwa kuoka keki za jua. Unaweza kuoka mikate ya jua pia!



Celestino alianza kuandaa warsha za kufundisha upishi wa jua kwa watoto wa shule na wanafunzi wa chuo kikuu cha umma kwa jumla. Mnamo mwaka wa Elfu mbili na kumi na sita (2016). Yeye na wenzake wa upishi wa jua walipanga mkutano wakuwaleta pamoja watafiti, mashirika yasiyo ya kiserikali, watengenezaji wanao penda kupika kwa kutumia miale yajua na waelimishaji ili kuwasilisha kazi zao na kushiriki mawazo ya kukuza teknolojia ya nishati ya jua. Mkutano huu maarufu "CONSOLFOOD", hufanyika kila baada ya miaka miwili nchini Ureno katika chuo kikuu. "Mapenzi yangu ya upishi wa jua yamenifanya kuwa na marafiki wengi kutoka duniani hkote." Celestino anasema.

Celestino na mkewe hupika sehemu kubwa ya kupikia kwa kutumia nishati ya jua kwenyetanuri ya jua aliyobuni kama Pucca - jiko la faneli lililo na msingi wa zege na vioo vya glasi vya fedha. Kwa sababu kuna zaidi ya siku mia tatu (300) za jua kwa mwaka kusini mwa Ureno, Celestino anakadiria asili mia

themanini (80%) ya milo yao hutayarishwa kwa kutumia tanuri(oveni) za jua. Celestino anataka upishi unaotumia nishati ya jua kuwa maarufu zaidi nchini mwake.

Utafiti zaidi kuhusu hali ya hewa ya Ureno. Ni mara ngapi unaweza kupika kwa miale ya jua (solar) huko Ureno?

SESSION TWO

MJADALA

Tumia mada iliyopendekezwa au mojawapo ya chaguo lako.

Tumia ukurasa huu kwa vidokezo vya majadiliano ya kikundi chako.

Mada Iliyopendekezwa: Je, unatarajia kujifunza nini kutokana na warsha hii? Je, mbinu mpya za kupika zinawezaje kutia nguvu? Je changamoto zitakuwa zipi? Je, mjadala huu unawezaje kusababisha hatua?

A large, empty rounded rectangular box with a black border, intended for participants to write their discussion notes or responses during the session.

SESSION THREE

KARIBU

Je, una lengo gani leo? _____

SOMO LENYE MAUDHUI

LATITUDO NA LONGITUDO

Mchoro unaonyesha mistari kuu ya latitude na longitude Duniani.

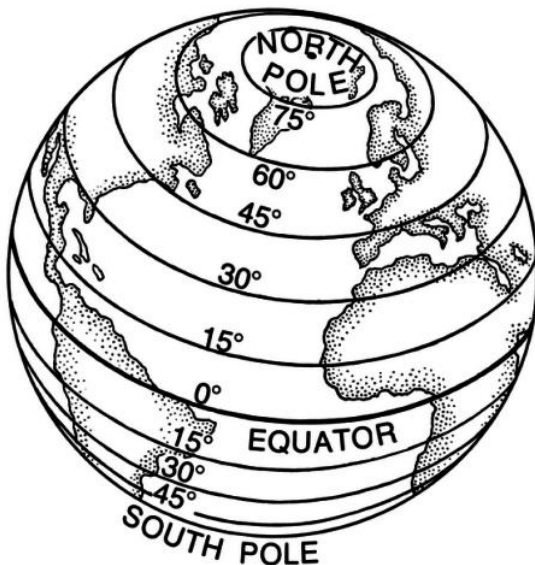
Nambari za latitude na longitude hufanya kazi kama gridi ya taifa. Unaweza kupata sehemu yoyote Duniani kwa kutumia jozi hii ya nambari. Nambari hizi huitwa kuratibu.

Ikweta imewekwa alama 0°.

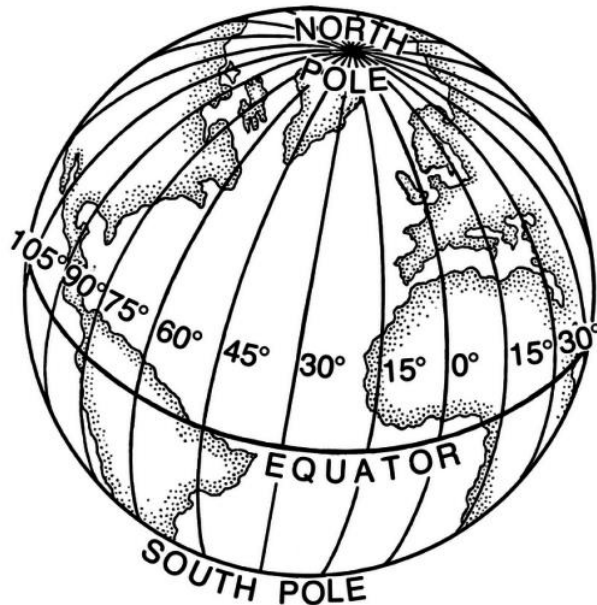
Juu ya ikweta, latitudo imewekwa alama Kaskazini (N).

Chini ya ikweta latitudo imeandikwa Kusini (S).

Lines of Latitude



Lines of Longitude



The Prime Meridian (0° longitudo) na Laini ya Tarehe ya Kimataifa (IDL) (longitudo 180°) hugawanya Dunia katika Kizio cha Mashariki na Kizio cha Magharibi.

Latitudo yako ni ipi? _____

Longitudo yako ni gani? _____

Je, unaishi katika Ulimwengu (Hemisphere) wa Kaskazini au Kusini? _____

Je, unaishi katika Ulimwengu (Hemisphere) wa Mashariki au Magharibi? _____

Je, unafikiri unaishi katika eneo ambalo ni nzuri kupika kwa kitumia jua? Kwa nini?

SESSION THREE

MISIMU MINNE

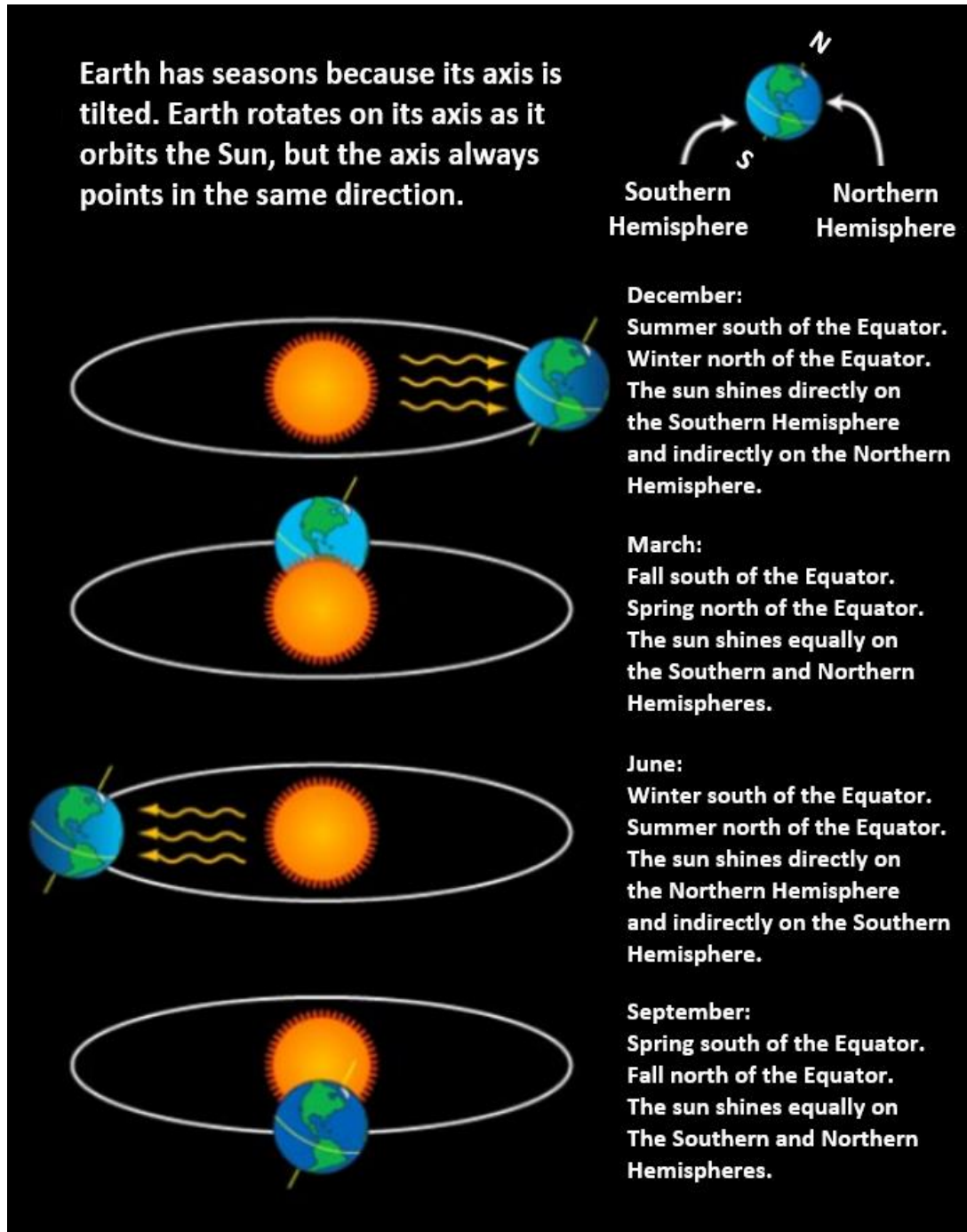
Umewahi kujiuliza kwa nini tuna misimu?

Kwa nini baadhi ya maeneo yana hali ya hewa ya baridi sana?

Kwa nini baadhi ya maeneo ni ya kitropiki?

Ina husiana na pembe ya Dunia inapozunguka jua na latitudo yako Duniani.

Unaweza kupika wakati wa msimu wowote ikiwa una masaa ya kutosha ya jua! Unaweza kupika wakati wa theluji ikiwa unajua!



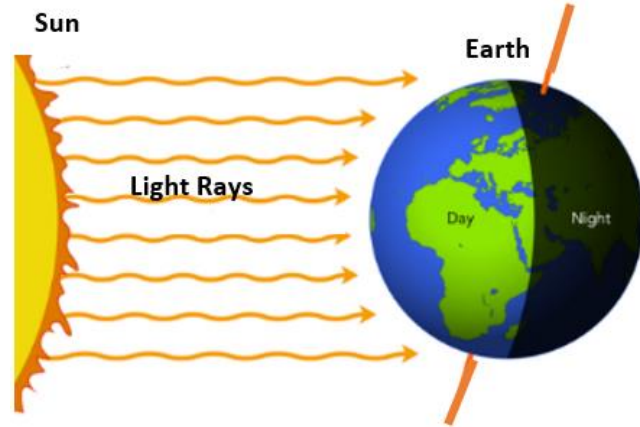
SESSION THREE

MCHANA NA HALI YA HEWA

Dunia inapogeuka, au kuzunguka, sehemu zingine hutazamana na jua wakati sehemu zingine ziko mbali na jua. Hii ni mchana na usiku.

Dunia inapozunguka, jua linaonekana kuwa linasonga angani. Jua lina weza kuwa chini au juu. Inategemea wakati wa siku.

Unapopika kwa kutumia miale ya jua, utajifunza kuweka tanuri yako ikitazama jua.



Lazima uwe na mwanga wa jua ili kupika kwa kutumia jua.

Ikiwa kitu kinazuia mwanga wa jua, huwezi kupika kwa jua. Ni nini kinachoweza kuzuia jua?



Mawingu mengi ni mabaya kwa kupikia kwa jua.



Usipike kwenye kivuli cha miti.



Majengo, ikiwa ni pamoja na nyumba, yanaweza kuzuia jua.

Utapika wapi na mwanga wa jua?

Je, unalo eneo ambalo hupata jua kwa saa mbili au zaidi?

Hali nyingine huathiri uwezo wa kupika kwa jua.

Usipike kwenye mvua. Siku zenye upepo zinaweza kuwa changamoto.



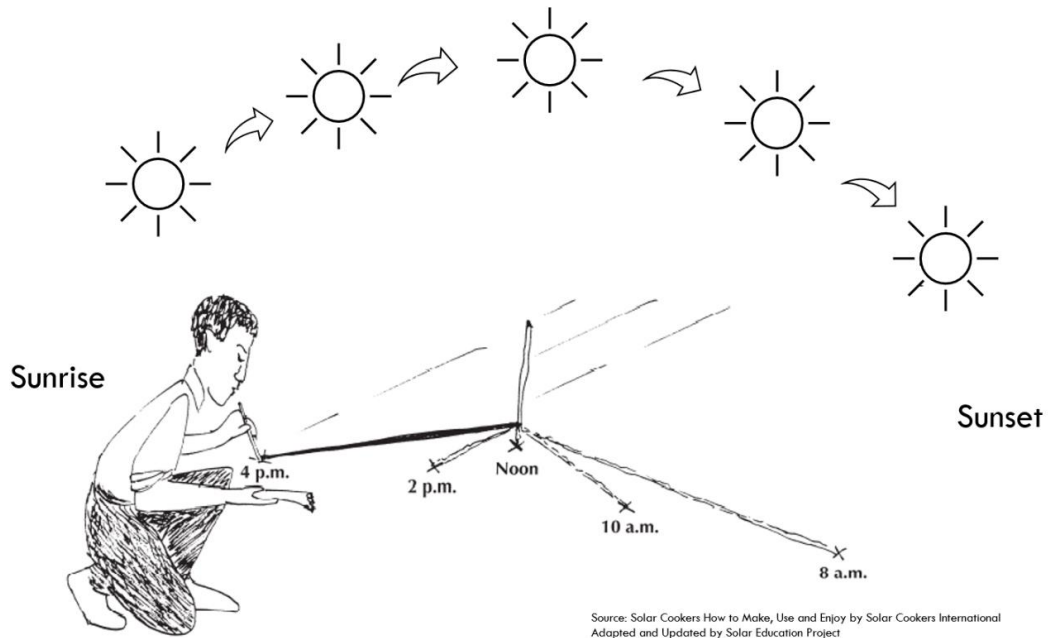
SESSION THREE

KUPIKA KWENYE JUA NA VIVULI

Wakati wa kujifunza juu ya kupikia jua, ni muhimu kuelewa jua.
Ni muhimu pia kuelewa vivuli!

Urefu wa kivuli unakuambia mahali ambapo jua iko angani.

Kivuli Kifupi = Jua Liko Juu = Bora Kwa Kupikia Jua
Kivuli Kirefu Zaidi = Jua Liko Chini = Ni Ngumu Zaidi Kupika Kwenye Jua



Kidokezo Kingine cha Kivuli from Solar Household Energy



Kuelewa vivuli na utakuwa mpishi bora wa jua.
Weka tanuri yako ya jua ikitazama jua.
Jua linaposonga, rekebisha tanuri yako.

SESSION THREE

CHAGUA WAKATI WA KUPIKA

Ni lini bora kupika kwa jua? Tazama picha tatu.

Ya kwanza inaonyesha nafasi nzuri ya jua kwa kupikia jua.

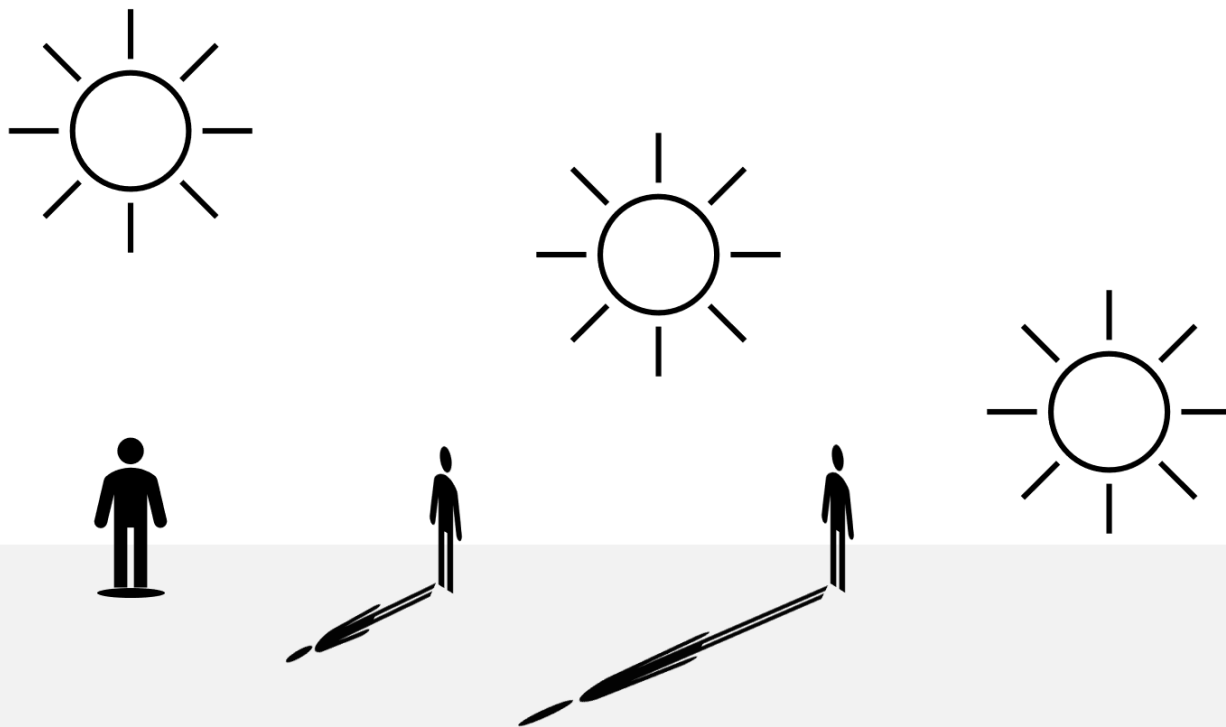
Ya pili nisawa ikiwa unatumia viakisi.

Ya tatu inaonyesha jua ambalo liko chini sana angani. Hii sio nzuri kwa kupikia kwa jua.

Swali: Kwa nini wakati mwingine jua huwa chini angani?

Jibu: jua haiana nguvu wakati ya machweo na mawio .

Jibu: Musimu mwingine jua huwa haina nguvu wakati latitudo iko juu.



Je, unaweza kupika kwa sola nyumbani kwako? Hapa kuna baadhi ya mambo ya kuzingatia:

Je, una nafasi ambapo jua huangaza kati ya saa nne asubuhi (10:00 am) na katikati ya alasiri?

Ni nini kinachoweza kuzuia jua linaposonga angani? Miti, nyumba, majengo mengine?

Angalia jua wakati wa mchana.

Amua wapi utaweza kupika kwa jua.

SESSION THREE

MAHUSIANO YA KIMATAIFA

Ni Wapi Duniani?

Kutana na Sara mwanamke kutoka Uswidi - Mpishiwa Solar, Blogu na Mwekezaji

Sara ni mpishi wa sola, mwana blogu, na mjasiri amali anayeishi Uswidi. Uswidi iko kaskazini mwa Ulaya kwenye Peninsula ya Scandinavia. Sehemu ya Uswidii kondaniya Arctic Circle.

Blogu ya Sara inakuzana kuelimisha kuhusu kupikia kwa kutumia nishati kwa uendelevu, uthabiti, na kuishi nje ya gridi ya taifa. Duka lake la mtandao ni huuza bidhaa kwa mtindo wa maisha usio na gridi na nishati. Kupika kwa kutumia jua nikipengele kimoja tu cha mtindo wa maisha ya

Sara wa maisha endelevu na utatuzi wa matatizo ya ubunifu.



Sarah alizaliwa huko Brazil, alielewa Italia na Uswidi, na akasoma Australia. Uzoefu huu ulimpa mitazamo ya kitamaduni tangu umri mdogo. Unawezaje kushiriki utamaduni wako na



Sara alikutana na upishi wa jua katika majarida ya sayansi na vipindi vya televisheni. Alifikiri ilionekana kuwa nzuri, lakini miaka ilipita kabla ya kujaribu mwenyewe. Mwanzoni, Sara alijaribu kutengeneza tanuri za kujitengenezea jua lakini hivi karibuni aliamua kwamba, kwake, itakuwa bora kununua tanuri iliyotengenezwa kitaalamu. Kwa hiyo, alianza kupika kwa kutumia jua kila siku kwa mafanikio makubwa! Sara alipenda kupika tangu akiwa mdogo, kila mara akijipa changamoto kujaribu mambo mapya. Upikaji wa jua unafaa maelezo hayo! Kadiri alivyo pika, ndivyo alivyotaka wengine pia kujua kuhusu hilo. Alianza kushiriki mtandaoni na kuanzisha kituo chake cha YouTube.

Kupika kwa kutumia jua kwenye latitude ya 59° Kaskazini na jua chini angani huleta changamoto fulani. Sara hutumia vijiko vinavyo faa vilivyopangwa kikamilifu ilikuunda mapishi tamu kama vile mkate wa unga, viazi vitamu, ngiri wa kukaanga polepole, vijiti vya bata mzinga, dengu zilizo pikwa pole pole na pizza za kupendeza!

Sara anasema, "Kupika kwa kutumia jua kume ni saidia kukuza hisia ya kupika kwa mdundona asili. Kama vile unavyojifunza kufanya kazi na maumbile, badala ya kupingana nayo, unapojifunza kusafiri kwa meli, kupika kwa jua kumenifundisha kufahamu sauti ya asili ya ulimwengu unao nizunguka. Imeathiri uchaguzi wangu wa mahali pa kuhamia na jinsi ninavyopanga siku zangu – haswa katika msimu wa joto.

Utafiti zaidi kuhusu hali ya hewa ya Uswidi. Ni mara ngapi unaweza kupika kwa jua huko Uswidi?

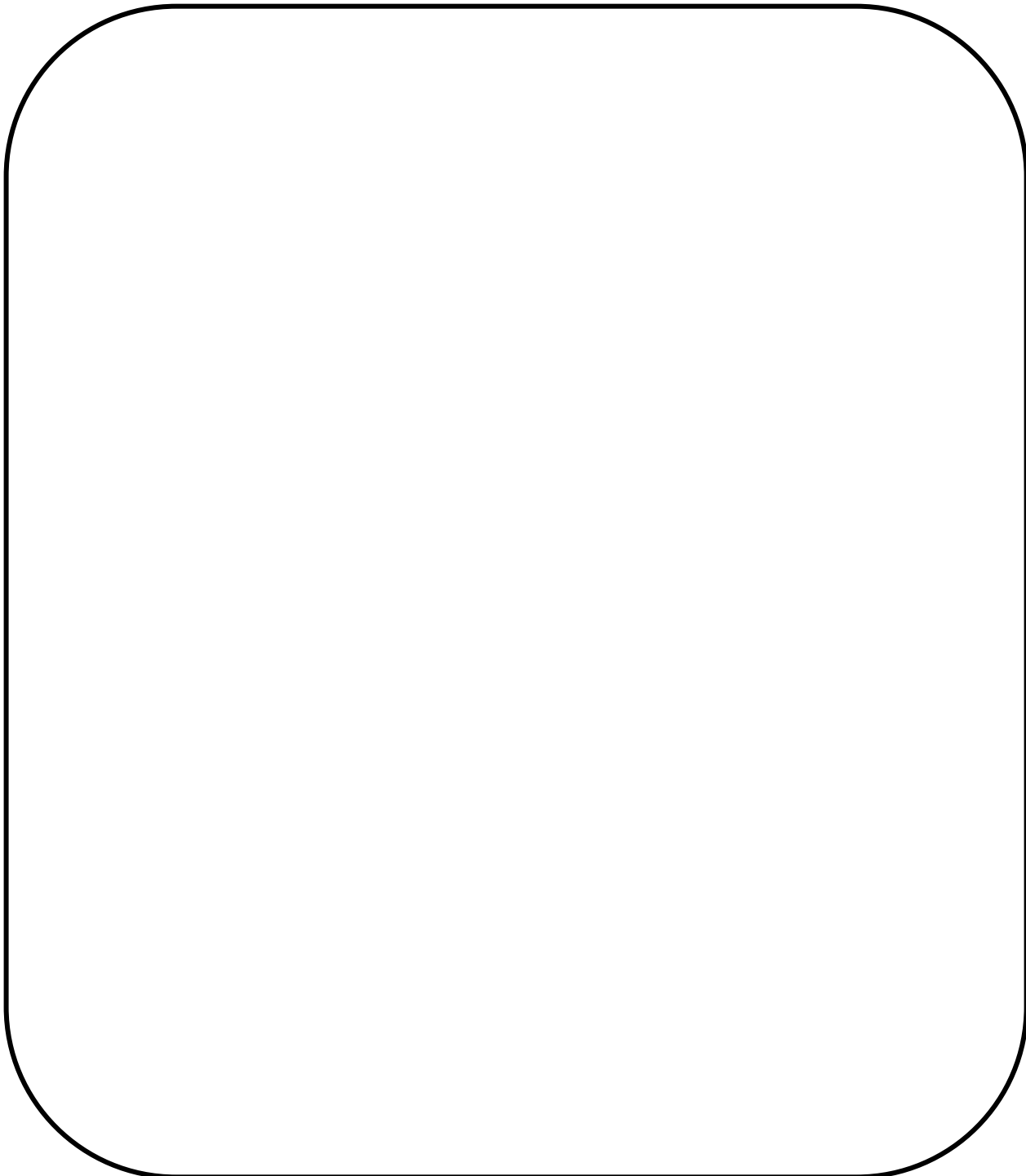
SESSION THREE

MJADALA

Tumia mada iliyopendekezwa au mojawapo ya chaguo lako.

Tumia ukurasa huu kwa vidokezo vya majadiliano ya kikundi chako.

Mada Iliyopendekezwa: Je, kikundi chako kinawezaje kugeuza uzoefu huu wa upishi kuwa onyesho la upishi? Je, video zinaweza kufanywa na kushirikiwa kwenye YouTube? Je, kikundi kinaweza kuunda kitabu cha upishi? Shiriki mawazo. Je, mjadala huu unawezaje kusababisha hatua?



SESSION FOUR

KARIBU

Je, una lengo gani leo? _____

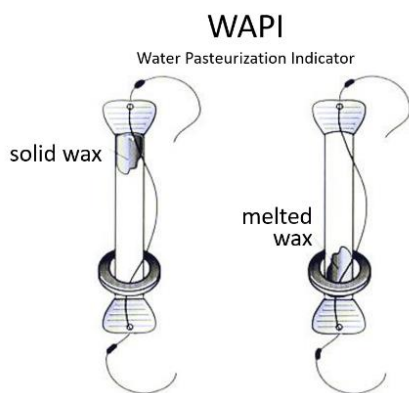
SOMO LENYE MAUDHUI

UPASTEURISHAJI NA WAPI - Water pasteurization indicator.

Joto linaloua vijidudu vya maji.

Vijidudu	Hua haraka kwa
Minyoo (Worms, Protozoa Cysts (Giardia, Cryptosporidium, Entamoeba))	55°C (131°F)
Viini – Bacteria (V. cholerae, E. coli, Shigella, Salmonella typhi), Rotavirus	60°C (140°F)
Homa ya ini - Hepatitis A virus	65°C (149°F)

Vijidudu kwenye maji havionekani. Baadhi yao, wanaoitwa vimelea vya majgonjwa (pathogens), wanaweza kukufanya mgonjwa sana. Kupasha maji joto ni njia mojawapo yakuua vijidudu hivi na kulinda afya yako. Hii inaitwa upasteurishaji. Maji ya upasteurishaji hukuinga magonjwa hatari, huboresha usafi, na hupunguza magonjwa yanayoenezwana maji machafu ya kunywa. WAPI inaweza kukusaidia kujua wakati majini salama.



WAPI ni nini? WAPI nimirija ya uwazi inayoweza kutumika tena yenye nta. WAPI hutusaidia kujua kama maji ni salama kunywa. Wakati WAPI inapokanzwa hadi 65°C (150°F) kwa dakika sita, nta inayeyuka. Hili ni joto ambayo vijidudu huwawa. Nta iliyo yeyuka huanguka chini ya bomba. Nta iliyo yeyuka inaonyesha kuwa maji ni salama.

Tanuri ya jua hufikia joto zaidi ya **65°C (150°F)**. WAPI inaweza kutumika na tanuri ya jua ili kuonyesha wakati hali ya joto ya upasteurishaji imefikiwa.

Ikiwa huna WAPI, unaweza kutumia kipima joto. Maji lazima yawe **65°C (150°F)** kwa dakika sita.

(Ikiwa huna njia yoyote ya kupima hali joto, unaweza kuchemsha maji ili kuua vimelea vya magonjwa.)



SESSION FOUR

MAHUSIANO YA KIMATAIFA

Ni Wapi Duniani?

Kutanana Elie mwanaume kutoka Haiti – Mpishi wa jua na Mwana mazingira

Elie anaishi Haiti. Haiti ni nchi ya kitropiki na milima. Ni sehemu ya kisiwa cha Hispaniola kati ya Bahari ya Karibu na Bahari ya Atlantiki. Mashariki mwa keninchi ya Jamhuri ya Dominika.



Elie anapenda sana mazingira. Anataka kufanya yote awezayo kukuza upishi wa jua.



Yeye ni mhitimu wa Université Notre Dame d'Haiti (UNDH) huko Hinche. Ana digrii katika Sayansi ya Matibabu ya Bio. Mnamo mwaka wa Elfu mbili na kumi na nane (2018), Elie alipokuwa mwanafunzi katika UNDH, alishiriki katika darasa la kipekee la Uendelevu ambalo lilisomea upishi wa jua na utengenezaji wa gesi asilia. Hii ilikuwa mara yake ya kwanza kuona jiko la sola. Mara moja alivutiwa na kustaajabishwa kwamba mwanga wa jua unaweza kupika chakula. Elie alifikiria juu ya uwezekano wa kupunguza kiasi cha mkaa kinachotumiwa kupikia nchini Haiti na kupunguza ukataji miti.

Mnamo mwaka wa Elfu mbili na kumi na tisa (2019), Elie alikutana na waanzilishi wa Mradi wa Elimu ya Jua walipojiunga na chuo kikuu kama wakufunzi wageni. Elie alijifunza mengi wakatiwa vipindi vyao vya kupika. Mapema mwaka wa Elfu mbili na ishirini (2020), alipata jiko la Haines 1 na akaanza kupika mara kwa mara. Aliunda jiko lake mwenyewe la Copenhagen Beast kama sehemu ya mradi wa utafiti na Chuo Kikuu cha Jimbo la Youngstown huko Ohio, USA. Elie anapenda kupika kwa jua. Anatengeneza omeleti, macaroni, keki na wali.

Elie anasema ni changamoto kuwashawishi watu kuwa mwanga wa jua unaweza kupika chakula. Anapo waonyesha majirani zake, hawawezi kuamini! Marafiki wanashangaa kwamba Elie anapika chakula cha mchana kwa jua kwenye maporomoko ya maji wanapo ogelea. Elie hasa anafurahia kufundisha kuhusu upishi wa jua katika shule za eneo hilo. Anafanya kazi na mtandao wama-shirika yasiyo ya faida ilikukuza upishi wa jua katika jamii na nchi yake.

Elie anasema, "Jua ni chanzo halisi cha nishati ambayo tunaweza kutumia kupika chakula, kwa hiyo hutusaidia kuokoa pesa, kulinda afya zetu kutokana na moshi wa makaa, na kulinda mazingira yetu ili kuepukana na ukataji wa miti."

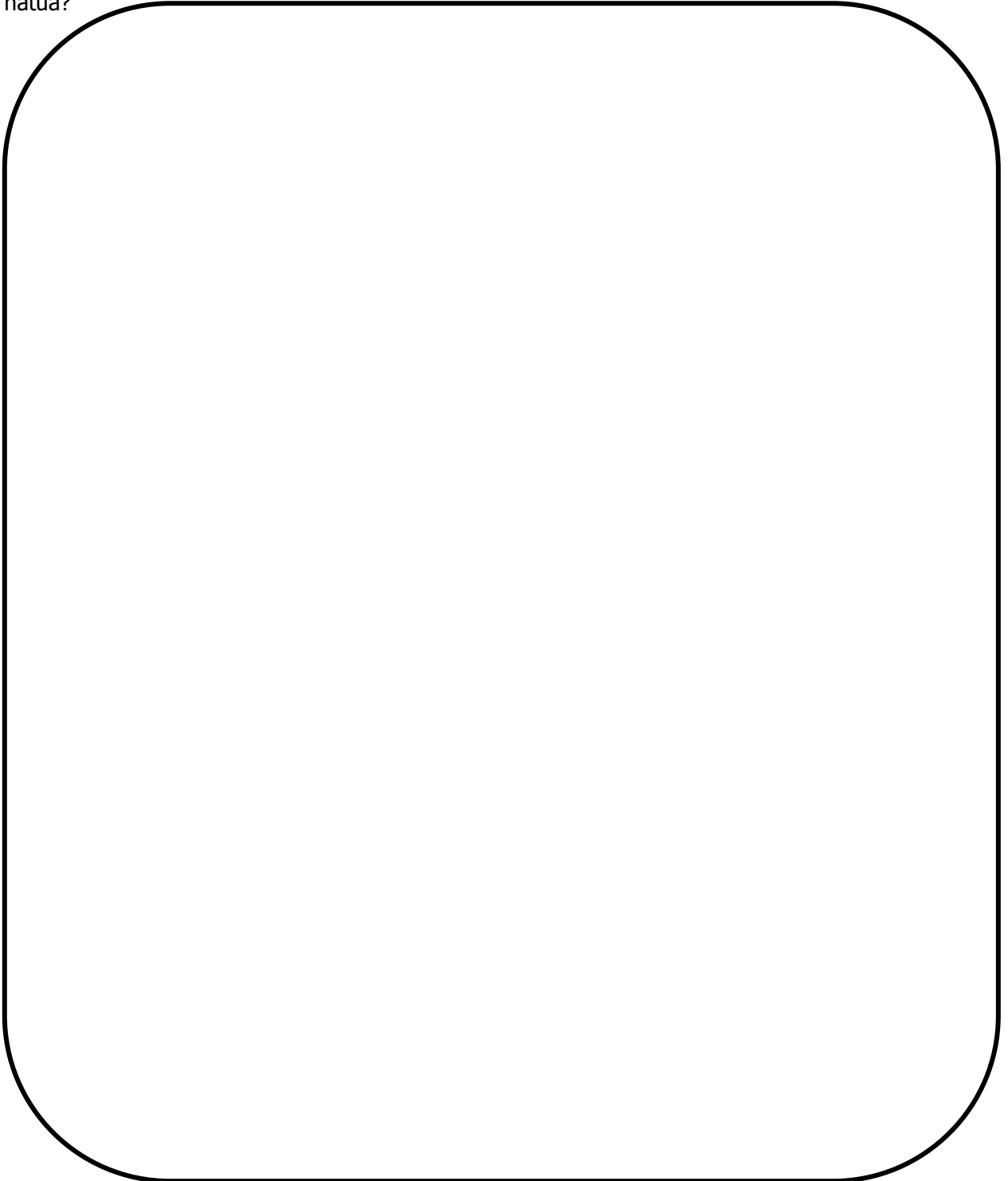
Utafiti wa kujua zaidi kuhusu hali ya hewa ya Haiti. Ni mara ngapi unaweza kupika kwa jua huko Haiti?

SESSION FOUR

MJADALA

Tumia mada iliyopendekezwa au mojawapo ya chaguo lako.
Tumia ukurasa huu kwa vidokezo vya majadiliano ya kikundi chako.

Mada Iliyopendekezwa: Je, kuna umuhimu gani wa kuweka mazingira yetu wenyewe katika hali ya usafi? Changamoto ni zipi? Matatizo yanaweza kutatuliwaje? Je, mjadala huu unawezaje kusababisha hatua?

A large, empty rounded rectangular box with a black border, intended for students to write their discussion notes or responses.

SESSION FIVE



Solar Cookers International inaeleza jinsi upikaji wa jua unavyoshughulikia Malengo yote kumi na saba ya Maendeleo Endelevu.

KARIBU

Je, una lengo gani leo? _____



Lengo la Kwanza: Kukomesha Jukumu la kupikia mafuta taa, makaa, kuni na gesi. Umaskini wa aina zote kila mahali

Upatikanaji wa nishati ya jua bila malipo kwa kuhakikisha teknolojia zinazofaa za nishati ya jua kwa karibu watu bilioni tatu (3) wanao pika hufanya maji kuwa salama kwa kunywa kwa kuchoma vitu vinavyo wezakuwa kwenye moto utasaidia kumaliza umaskini wa nishati. Hadi asilimia arubaini (40%) ya bajeti ya nishati ya kaya hutumiwa kupokanzwa maji. Kupunguza kiasi cha biomasi iliyo kusanywa na nishati inayo nunuliwa kwa nishati ya jua isiyo toa hewa sifuri hujenga ustahimilivu, hasa kwa maskini na wale walio katika mazingira magumu. Kwa sababu upatikanaji wa nishati kwa wote ni muhimu kwa maendeleo, sera zinazohimiza uvumbuzi katika teknolojia ya jua zitasaidia kumaliza umaskini, kwa aina zake zote kila mahali.



Lengo la Pili: Kukomesha njaa, kufikia usalama wa chakula na lishe bora, na kukuza kilimo endelevu

Vyakula vya lishe kama vile kunde vinahitaji kiasi kikubwa cha adimu au ghali majani au nishati ya kisu kuku ili kupika. Kwa nishati ya jua isiyo lipishwa ya mafuta ya kupikia, familia zinaweza kuendelea kupikavyakula vyenye lishe bora, nakumaliza utapiamlo. Kwa sababu vyakula vyote vyakitamaduni vinawezakupikwa katika jiko la mafuta ya jua, hujenga uwezo wakustahimili hali tete ya bei ya chakula. Kwa sababu upatikanaji wa nishati ya jua hupunguza mahitaji ya biomasi na mafuta yaliyotolewa, ardhi, udongo na maji huborehwa.



Lengo la Tatu: Hakikisha maisha ya afya na kukuzaustawi kwa wote katika umri wote

Wanawake na watoto wao wadogo hukabiliwa na mfiduo wa juu zaidi wa uchafuzi wa hewa ya kaya, sababu kuu ya ugonjwa: zaidi ya malaria, Ukimwi, na ugonjwa wakuwara. Vijiko vya mafuta ya jua hupunguzakukabiliwa na uchafuzi wahewa wa kaya ambao husababisha vifo vya mapema milioni seba (7) kila mwaka, ikijumuisha asilimia hamsini (50%) ya vifo vinavyotokana na nimonia kwa watoto walio chini ya umri wa miaka mitano. Kwa sababu jiko la jua halina hatari ya moto, hatari ya kuharibika au kufa kutokana na kuungua kuto-kanana moto wa kupikia hupunguzwa sana, hasa kwa wanawake na watoto.



Lengo la Nne: Kuhakikisha Elimu Bora, Yenye Usawa na Kutoa Fursa kwa Wote Kujiendeleza

Wakiwa wameachiliwa kutoka kwa kazi zinazo chukua muda za kukusanya mafuta ya toka-nayo na mimea kwa ajili ya kupikia moto kwa kutumia nishati ya jua, walio katika mazingira magumu, wakiwemo watu wenye ulemavu, watu wa kiasili, na watoto, wanapata muda wa elimu na masomo.



Lengo la Tano: Kufikia usawa wa kijinsia na kuwawezesha wanawake na wasichana wote

Katika tamaduni nyingi, kazi inayo chukua muda wa kutafuta kuni za kupikia ni kazi ya wanawake na wasichana. Wakisafiri mbali na usalama wa nyumba zao na jamii kukusanya nishati ya mimea, wanawake nawatoto mara nyingi hushambuliwa, kubakwa, au kuuawawa kati wakukusanya kuni kwa ajili ya kaya zao. Kutumia jiko la jua hupunguza uwezekano wa wanawake na watoto kwenye vurugu. Kwa kutumia nishati ya jua bila malipo ya kupikia, wanawake na watoto wanaweza kupata hadi masaa tano (5) kwa siku kwa shughuli nyinginezo, kama vile elimu na ushiriki wa jamii, kuwawezesha kwa uongozi katika jumuiyazao. Hii ni hatua muhimu ya kwanza kwa mageuzi mengi yanayo hitajika ya kijamii.

SESSION FIVE



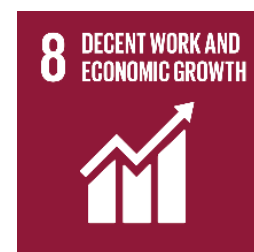
Lengo la Sita: Kuhakikisha upatikanaji na usimamizi endelevu wa maji na usafi wa mazingira kwawote

Usimamizi endelevu wa usambazaji wa maji ya kunywa utategemea ufugaji ulio gatuliwa wa vyanzo vyamaji vya ndani. Vijiko vya nishati ya jua hufanya maji kuwa salama kwa kunywa, kukabiliana na uhaba wa maji na kupunguza ugonjwa wa kuhara.



Lengo la Saba: Kuhakikisha upatikanaji wa nishati nafuu, inayotegemewa, endelevu na ya kisasa kwa wote

Nishati ya jua ni nishati ya kisasa ya kweli: haina haja ya kukusanywa au kununuliwa, na inapatikana katika mabara yote, katika mikoa yote. Haihitaji mnyororo wa ugavi, na hakuna miundo mbinu kwa ajili ya utoaji. Nishati ya joto ya jua inaufanisiwa juu zaidi wa nishati kuliko vyanzo vyote vya nishati.



Lengo la Nane: Kukuza ukuaji endelevu wa uchumi, shirikishi na endelevu, ajira kamili na yenye tija na kazi zenye staha kwa wote.

Kwa kupika kwa kutumia nishati ya jua bila malipo, gharama za mafuta ya kaya ambazo hapo awali zilitumika kwa kupikia na kusafisha maji zinaweza kuelekezwa kwenye mahitaji mengine ya familia. Kwa uhitaji mdogo wa kukusanya nishati ya mimea, na safari chache za kwenda sokoni kununua mafuta, wanawakehupata muda wa elimu ambayo inasababisha ajira yenye tija na kazi zenye staha.



Lengo la Tisa: Kujenga miundo mbinu thabiti, kukuza maendeleo ya viwanda jumuishi na endelevu kukuza uvumbuzi.

Teknolojia za nishati ya jua hupunguza hitaji la miundo mbinu ya nishati kwa kutoa ufikiaji wa nishati iliyogawanywa. Teknolojia nyingi za kupikia kwa kutumia nishati ya jua zinaweza kutengenezwa kwa bei nafuikutoka kwa nyenzo za ndani au za kikanda. Teknolojia ya kupikia nishati ya jua inapatikana kwa wavumbuzi wa ndani, kuongeza ufikiaji wa biashara ndogondogo, na kusaidia ustawi wa binadamu na maendeleo ya kiuchumi. Kwa sababu nishati ya jua inapatikana kwa wote, inajumuisha. Nishati ya jua ni chanzo cha nishati endelevu, na kuongeza utulivu wa nishati na ustahimilivu.



Lengo la Kumi: Kupunguza usawa ndani na miongoni mwanchi

Nishati ya jua isiyolipishwa inathamani ya juu zaidi kwaa silimia arubaini (40%) ya chini ya idadi ya watu duniani, ambao watafaidika zaidi kutokana na kuongezeka kwa upatikanaji wa nishati isiyolipishwa ya madaraka. Nishati ya jua inaweza kufikiwa na watu wote wakati wa misimu ambapo nishati ya jua inapatikana, bila kujali umri, jinsia, ulemavu, kabila, asili, dini, au hali ya kiuchumi au nyinginezo.



Lengo la Kumi na Moja: Kufanya miji na makazi ya watu kuwa pamoja, salama, thabiti na endelevu

Nishati ya jua inaweza kunaswa kwa matumizi ya kaya na kitaasisi katika mazingira ya mijini ambapo nishati ya mimea haipatikani, na hivyo kupunguza utegemezi wa nishati ghali na zisizo endelevu za kupikiana ufugaji wa maji. Ufikiaji wa vyanzo vya nishati ya jua hupunguza ushindani wa nishati, kupunguza migogoro ya binadamu katika mazingira yenye msongamano mkubwa.

SESSION FIVE



Lengo la Kumi na Mbili: Hakikisha matumizi endelevu na mifumo ya uzalishaji.

Nishati ya jua ya kutosha hufika kwenye uso wa Dunia kila saa ili kuwasha shughuli zote za binadamu kwa mwaka mmoja. Kwa sababu nishati ya jua bila malipo, isiyotoa moshi ina mnyororo wa usambazaji wa asili na sawa, gharama za mazingira za uzalishaji wa mafuta na usafirishaji kwenda sokoni zimepunguzwa. Matumizi ya nishati ya jua kwa ugatuzi yanaweza kuchangia mifumo endelevu ya matumizi na uzalishaji wa nishati ya kaya, na hivyo kupunguza upotoshaji wa soko.



Lengo la Kumi na Tatu: Chukua hatua za haraka ili kukabiliana na mabadiliko ya hali ya hewa na athari zake.

Matumizi ya nishati ya jua bila malipo, isiyotoa hewa sifuri hupunguza uzalishaji wa mawakala wa kulazimisha mabadiliko ya hali ya hewa, kama vile gesi chafu zina kaboni nyeusi inayo zalishwa na nishati ya kisukuku na nishati ya mimea.



Lengo la Kumi na Nne: Kuhifadhi na kutumia bahari, bahari na rasilimali za baharini kwa maendeleo endelevu.

Misitu yenye afya ni mifereji ya kaboni muhimu, inayoweka kaboni kwenye ardhi ili isiweze kufyonzwa nabahari za dunia. Kubadilisha mioto ya mwako wa majani na nishati ya jua kwa mahitaji ya kimsingi ya kaya kuna kuza uhifadhi wa majani yenye afya, kuongeza uwezo wa ardhi kwa kunyonya maji, na kupunguza mtiririko wa uchafuzi wa mazingira na udongo ulio momonyoka ambao husonga vijito na kuweka mbolea katika bahari.



Lengo la Kumi na Tano: Kulinda, kurejesha na kuendeleza matumizi endelevu ya mifumo ikolojia ya nchi kavu, kudhibiti misitu kwa njia endelevu, kukabiliana na hali ya jangwa, kusimamisha na kurudisha nyuma uharibifu wa ardhi na kukomesha upotevu wa bayoanuai.

Kiwango cha kuenea kwa jangwa kinaweza kupunguzwa wakati nishati ya jua inachukua nafasi ya nishati iliyo vunwa ya majani kwa matumizi ya kaya. Kupikia na kuweka maji kwa kutumia nishati ya jua kunaweza kusaidia usimamizi wa misitu, kukomesha uharibifu wa ardhi, nakuzuia kuenea kwa jangwana uchafuzi wabaharini.



Lengo la Kumi na Sita: Kukuza jamii zenye amani na umoja kwa maendeleo endelevu, kutoa ufikiaji wa haki kwa wote na kujenga taasisi zenye ufanisi, zinazo wajibika na shirikishi katika ngazi zote.

Upatikanaji wa nishati ya jua bila malipo ni muhimu ili kufikia haki mbili muhimu zaidi za binadamu: chakula kilichopikwa na maji safi. Nishati ya jua ndicho chanzo cha mwisho cha nishati jumuishi: kwa kupunguza ushindani wa nishati adimu na ghali, inapunguza migogoro ya binadamu.



Lengo la Kumi na Saba: Kuimarisha njia za utekelezaji na kuhuisha ushirikiano wa kimataifa kwamaendeleo endelevu.

Sekta ya kupikia jua ina historia dhabiti ya teknolojia inayofaa. Kushirikisha na maarifa kwa uvumbuzi wa upishi wa nishati ya jua huimarisha na kuwawezesha wanajamii, hasa wana wake, kuwa mawakala wa mabadiliko kwa ajili ya kuhuishwa, maendeleo endelevu.

SESSION FIVE

Tumia nafasi kwenye ukurasa huu kukamilisha shughuli zilizo pendekezwa katika somo.

1. Unaweza kufanya nini katika nyumba yako na familia yako ili kusaidia maendeleo endelevu (SDGs)?
Ni maendeleo endelevu (SDGs) zipi zinazo kuvutia zaidi?

 2. Orodha ya Haki ya Wananchi ya Changamoto za Mitaa katika Jumuiya Yako

 - A. Unawezaje kufanya maendeleo katika changamoto hizi? Toa mifano.

 - B. Je, mafanikio yangukwaje kwa changamoto hizi?

 - C. Je, kikundi kinawezaje kuongeza uelewa wa umma kuhusu maendeleo endelevu (SDGs) katika jamii?

 3. 1. Naweza _____
- Chora unavyo fikiri ulimwengu ungekuwa kama tukipata mafanikio na maendeleo endelevu (SDGs).

SESSION FIVE

MAHUSIANO YA KIMATAIFA

Ni Wapi Duniani?

Kutanana Juana ni mwanmke kutoka Mexico - Jua la kukausha, Mpishi wa kutumia Jua, na Mwandisi wa Joto.

Juana anaishi Mexico ambako anafanya kazi kama mhandisi wa mradi wa nishati ya jua katika kampunikubwa ya utengenezaji wamiale ya jua inayo hudumia sehemu nyingi za Amerika Kusini. Mexico ni nchi iliyoko kusini mwa Amerika Kaskazini. Ina mipaka na nchi tatu na miilimi tatu kubwa ya maji.



Juana anashiriki ufumbuzi wa nishati ya jua kwa masuala ya usalama wa chakula yanayowakabili watu wengi duniani kote.



Juana anajua uwezekano wa nishati ya jua kutatua masuala mengi ya nishati yanayo wakabili watu nchini Mexico na duniani kote.

Moja wapo ya shauku kubwa ya Jua na nikukausha vyakula kwa kutumia nishati ya jua. Bidhaa za chakula zilizopandwa hivi karibuni ambazo hazijachakatwa huanza kuoza baada ya muda mfupi. Kukausha kwa jua ni suluhisho la asilina la bei nafuu ambalo huhifadhi chakula. Juana anashiriki utaalum wake katika mbinu za kukausha kwa jua na ujenzi wa ukame na watu wengi nchini mwake na kimataifa. Yeye ni mtangazajimahiri na mwenye shauku wa teknolojiahii!

Kupika na kukausha vyakula kwa nishati ya jua kulibadilisha maisha ya Juana na anamwambia kila mtu kwamba ulimwengu wake ni ulimwengu wa jua!

Juana anasema, "Sasa ninapo ona jua likiwaka, papo hapo nadhani hiyo ni siku ya ajabu ya kupika na kukausha kwa jua." Juana na familia yake wanajaribu kurekebisha mapishi ya kiasili ya kupikia kwa kutumiajua.

Kupika na kukausha kwa jua hakujabadilisha maisha ya Juana tu, lakini pia imebadilisha familia yake. Sasa, wanashiriki upendo

wa chakula cha jua na kujenga jiko la jua ambalo wanaweza kushirikiana na watukaribu na jamii. Kuna uzuri mwingi katika usindikaji wa chakula kwa nishati ya jua, na Juana yuko kwenye dhamira ya kuhakikisha wengine wanajua wema huo pia.

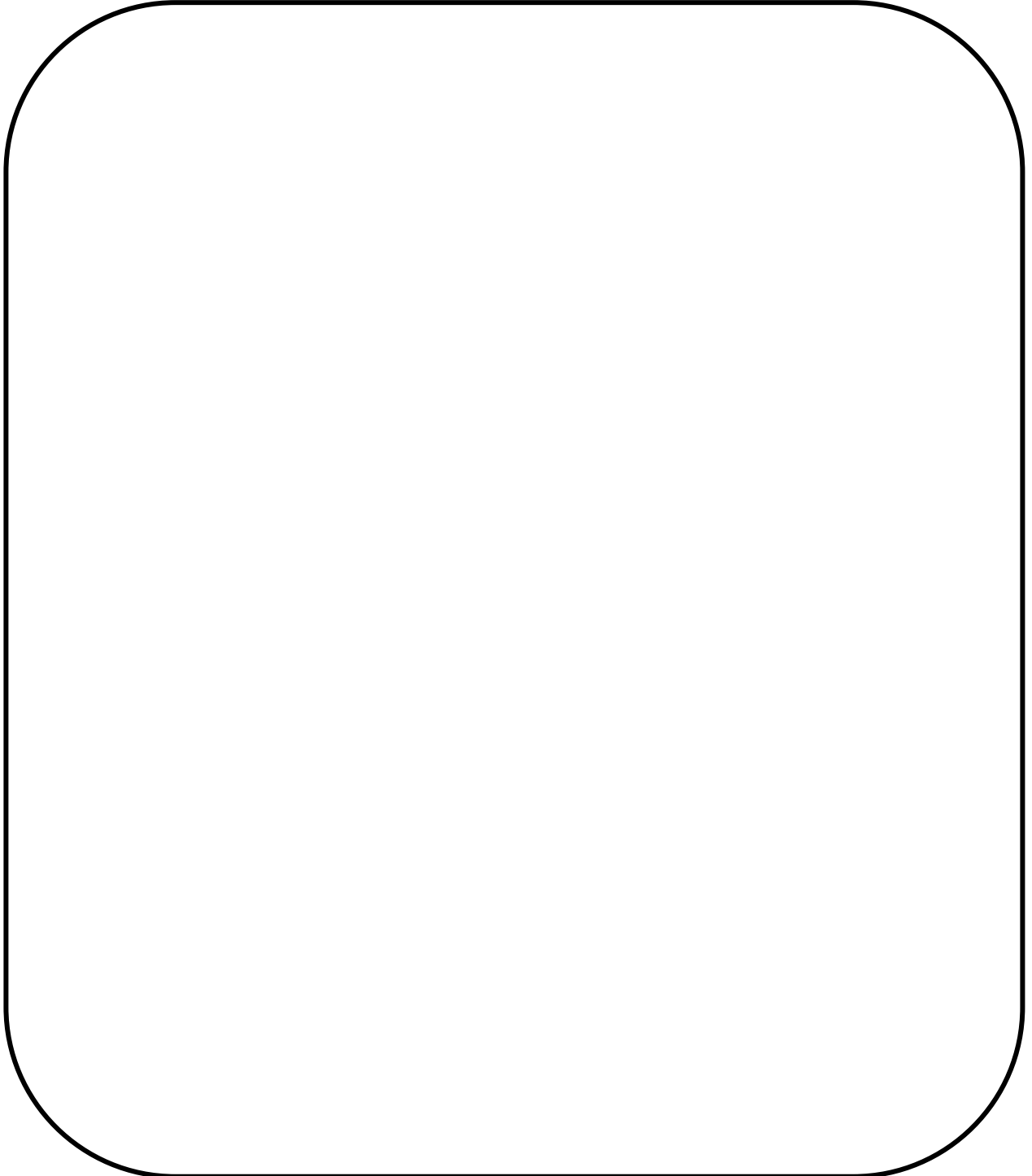
Utafiti ili kujua zaidi kuhusu hali ya hewa ya Mexico. Ni mara ngapi unaweza kupika kwa jua huko Mexico? Je, hali ya hewa ni sawa au tofauti kote nchini?

SESSION FIVE

MJADALA

Tumia mada iliyopendekezwa au mojawapo ya chaguo lako.
Tumia ukurasa huu kwa vidokezo vya majadiliano ya kikundi chako.

Mada Iliyopendekezwa: Ni nini kingine ambacho cooker za jua zinaweza kutumika? Jadili jinsi vyakula vinaweza kukaushwa. Kuna faida gani ya kukausha mboga, matunda, na nyama? Jadili jinsi vyakula vya kukausha kwa jua huboresha maisha yao marefu. Je, mjadala huu unawezaje kusababisha hatua?

A large, empty rounded rectangular box with a black border, intended for students to write their discussion points.

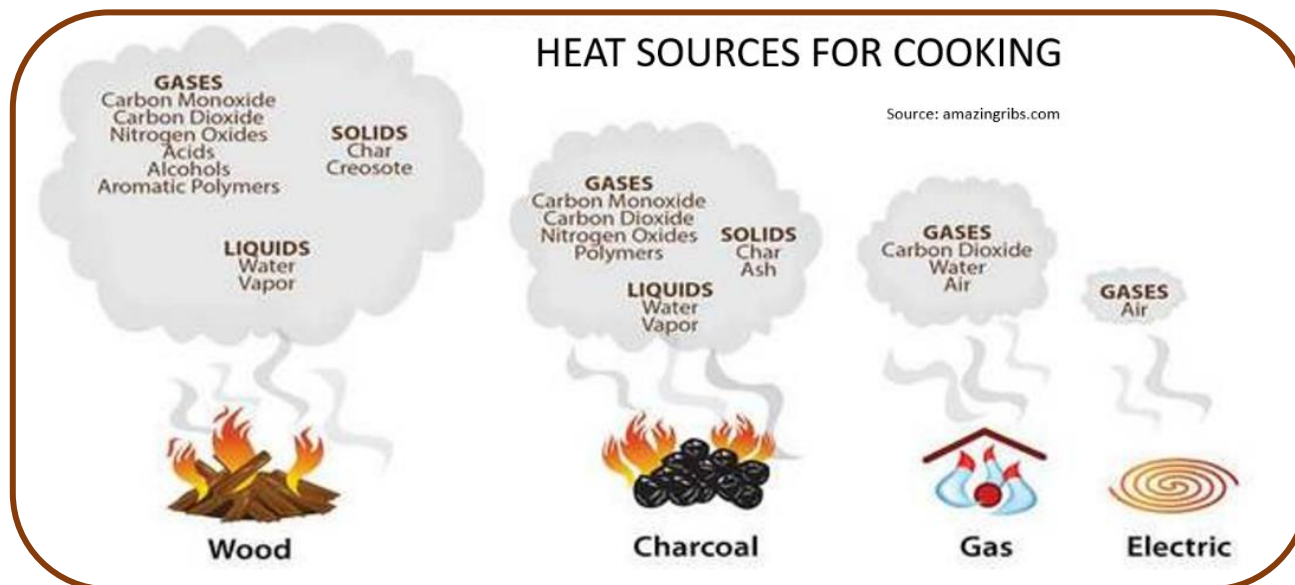
SESSION SIX

KARIBU

Je, una lengo gani leo? _____

AFYA NA KUPIKA KWA MOTO

Unahitaji joto ili kupika chakula. Kuna njia nyingi za kuzalisha joto hili. Mmoja wao ni



Kupika kwa mafuta kama vile kuni au mkaa. Uchomaji hutoa moshi. Kuna tofauti nyingi chembe na gesi zilizopatikana katika moshi. Wanaweza kusababisha matatizo ya afya kwa mapafu na moyo.

Kuvuta Moshi wa Kuni

Chembe nyingi za moshi wa kuni ni ndogo sana hivi kwamba zinafikia sehemu ya kina ya mapafu.

Mara baada ya hapo, wanaharibu alveoli na kuingia kwenye damu, na kusababisha kuvimba na kubeba sumu katika mwili wote.



Angalia mchoro hapo juu. Ni moshi gani ulio na gesi na chembe nyingi zaidi?

Ni nini baadhi ya gesi ni imara? Ni ipi iliyo na gesi ndogo, imara na vimiminika?

Unatumia yoyote ya vyanzo hivi vya joto kupika chakula chako?

Chembe katika moshi ni ndogo sana. Baadhi yao ni microscopic.

Wanaingia kwenye pua na koo. Wanaweza kwenda kwenye sehemu ya kina ya mapafu.

Katika mapafu, husababisha bronchitis (mkamba), nimonia, pumu, au magonjwa mengine makubwa ya kupumua.

Wanaharibu alveoli.

Alveoli ni sacs za hewa katika mapafu. Wanachukua oksijeni na kuipitisha kwenye damu. Wanaondoa dioksidi ya kaboni.

SESSION SIX

MONOXIDE YA KABONI

Gesi pia inapatikana katika moshi na moto. Moja ya gesi hizi ni carbon monoxide (CO).

Gesi hii haina harufu wala ladha. Inazalishwa wakati wowote vifaa vinavyo chomwa.

Uingizaji wa hewa (Ventilation) mbaya inaruhusu CO kujenga katika hewa.

Unapopumua ndani, husababisha sumu ya kaboni monoxide. Inaweza hata kusababisha kifo.



Ni dalili gani za sumu ya kaboni monoxide? Angalia orodha ili kuona baadhi yao.

Kutoka kwenye chati: Kizunguzungu, Maumivu ya Kifua, Kuchanganyikiwa, Maono ya giza (Blurred), Maumivu ya kichwa, Upungufu wa Pumzi, kichefuchefu (Nausea).

Dalili zingine: Uchovu, Maumivu ya tumbo, na ugumu wa kupumua.

Kadiri unavyopumua zaidi, dalili zako zinazidi kuwa mbaya zaidi.

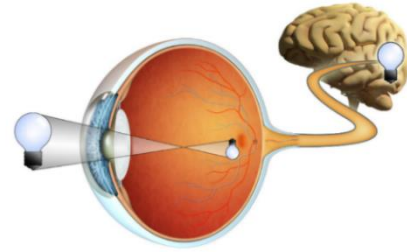
Sumu ya CO (Carbon monoxide) inaweza kusababisha kifo.

Chati kutoka Potawatomi.org tafsiri na Swahili by Solar Education Project and St Joseph Eldoret Solar Cooking Workshop Steering Committee

SESSION SIX

EYES AND BURNS

Macho yetu ni viungo muhimu vya hisia. Macho hukusanya mwanga kutoka kwa ulimwengu unaotuzunguka. (Ya mwanga huo huo ambao unatusaidia kupika kwa jua.) Mwanga unabadilishwa kuwa ishara za neva(nerve). Ishara ni kupelekwa kwenye ubongo ambapo hutafsiriwa. Hivi ndivyo tunavyoona. Ni muhimu kulinda macho yetu na maono yetu.

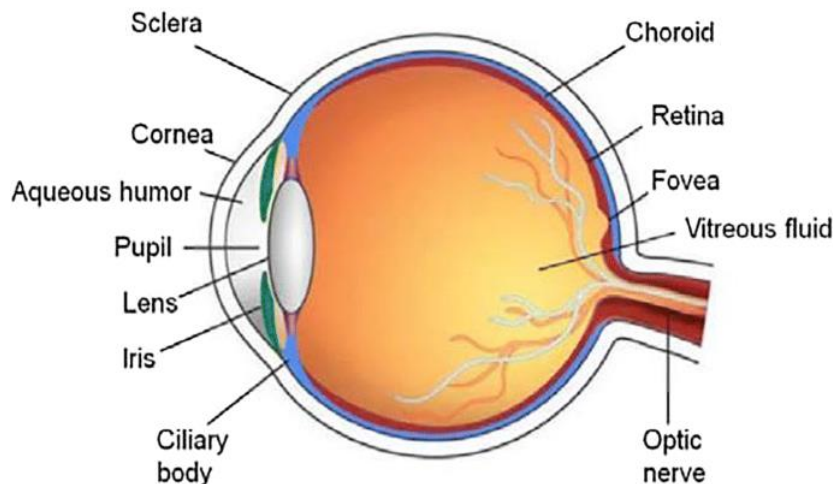


Moshi, chembe, na moto unaweza kukasirisha tishu laini za jicho na kusababisha wekundu, kuchoma, kuwasha, maono ya ukungu na kuzuia njia (ducts) za machozi.

Utafiti unaunganisha kupikia moto wa kila siku na hatari kubwa ya matatizo haya ya macho.

Mtoto wa Jicho - Cataracts (Lens), Kiunganishi - Conjunctiva (Lining of the Eye Lid), na DSCIC (Matatizo ya Sclera, Cornea, Iris & Mwili wa Ciliary)

Je, unaweza kupata baadhi ya sehemu zilizo athiriwa?



gpoh.de

Kuchoma kutoka kwa moto au cheche kunaweza kusababisha maumivu na makovu. Kuchoma kuhusiana na kupikia inaweza kutokea mahali popote na kwa mafuta yoyote ya kupikia. Kuchoma kunaweza kusababishwa na moto, maji ya kuunguza (scalding), mafuta ya moto au bidhaa za kupikia moto. Kupika kwa moto unaotoka nje ya udhibiti unaweza kuharibu nyumba. Tunawezaje kuzuia kuchomwa na moto?

Kupika kwa jua na kupikia joto lililohifadhiwa ni njia za kupika bila moto ('FIRELESS COOKING'). Lakini lazima tuwe salama na kupikia jua pia!

SESSION SIX

MAHUSIANO YA KIMATAIFA

Ni Wapi Duniani?

Kutana na Luther kutoka Marekani – Mpikia Jua (Solar Cook), Uhalifu wa MPD, Mchambuzi wa Kuzuia, Mpiga Video (Videographer), na Mkusanyaji wa Tanuri (Oven) ya Jua.

Luther anataka kuonyesha kwamba watu hawana "haja ya kufanywa kwa fedha ili kufanya tofauti ya mazingira." Jinsi gani unaweza kufanya tofauti nzuri?



Luther anaishi Minnesota, Marekani ambako anafanya kazi kama Mchambuzi wa Kuzuia Uhalifu wa Polisi wa Minneapolis. Marekani ni nchi ya Amerika ya Kaskazini. Nchi hizo zinapakana kwa nchi mbili, bahari mbili, Ghuba ya Mexico. Minnesota inachukuliwa kuwa jimbo la kati ya magharibi.



Luther kwanza anakumbuka kuona tangazo la sanduku la jua ya Tanuri ya katika jarida. Miaka kadhaa baadaye, akiwa likizo, Luther alipata Tanuri (oven) hiyo hiyo katika duka la mbele. Hakununua oveni siku hiyo, lakini aliondoka na kitabu, *Akipika kwa Jua*, na Beth na Dan Halacy.

Kurudi nyumbani huko Minnesota, alitumia mfano kutoka kwa kitabu kujenga Tanuri (oveni) ya jua kwa kutumia mbao (plywood), insulation ya kadibodi, glasi, na foili. Kupika na Tanuri (oven) hii kulimshawishi kuwa kupikia jua. Ilikuwa kwa ajili ya kweli. Alitengeneza Tanuri (oveni) tano zaidi na kuzitoa kwa Wapwa!

Mwaka baada ya mwaka, hamu ya Luther katika kupikia jua ilikua katika shauku ambayo alitaka ku-shiriki. Yeye na Mke wake alianza kuandaa chakula cha mchana (brunches) kwa jamii nyumbani kwao. Chakula (risotto, souffles, lasagna, mkate wa ndizi, na zaidi) hupikwa kwa jua. Hisia ni ya kupumzika, ya kirafiki, na ya kuelimisha. Luther pia aliunda darasa la kupikia jua kwa shule za umma za jiji, elimu ya jamii na mpango wa mwaka Elfu mbili na ishirini (2020).

Luther amepata zaidi ya aina sabini (70) za tanuri (oveni), ambazo zingine zina umuhimu wa kihistoria. Anatumai siku moja ataanzisha Makumbusho ya Solar Oven.

Luther anavutia maslahi yake katika ukumbi wa michezo na kuandika wakati anasafiri nchi kuzalisha podikasiti (podcasts) akishirikiana na watu wengi ambao wamejitokeza kupikia jua katika maisha yao. Kama Luther, hawa ni watu ambao, kama anavyosema, "kuingia katika mzunguko wa asili wa mambo ili kuruhusu jua kufanya kupika."

Utafiti ili kujua zaidi kuhusu hali ya hewa ya Minnesota. Ni mara ngapi unaweza upishi wa jua huko Minnesota?

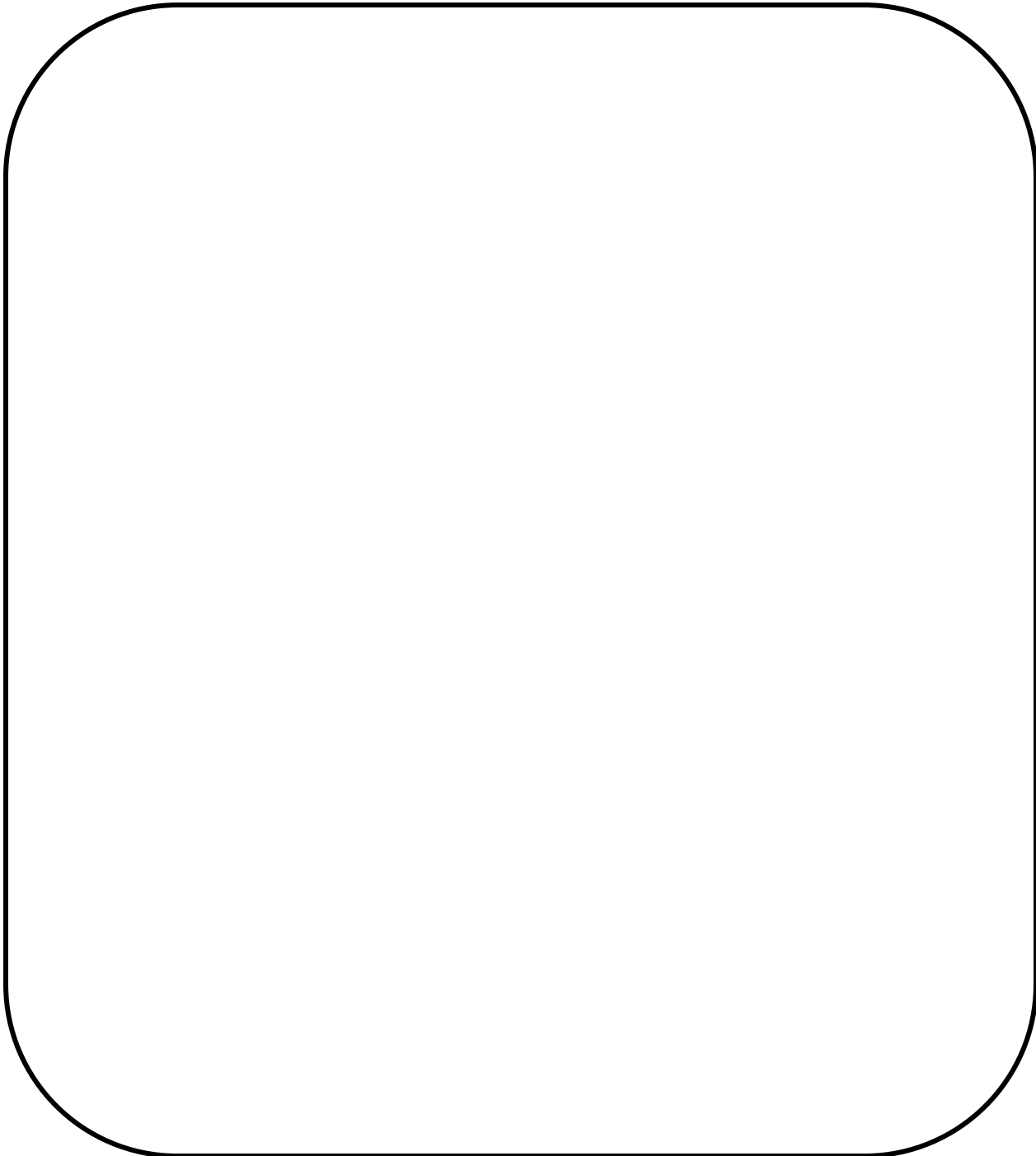
SESSION SIX

MJADALA

Tumia mada iliyopendekezwa au mojawapo ya chaguo lako.

Tumia ukurasa huu kwa vidokezo vya majadiliano ya kikundi chako.

Mada Iliyopendekezwa: Je, tunaweza kufanya nini ili kueneza habari kuhusu upishi wa jua? Jadili jinsi Luther anavyoshiriki habari. Je, ni njia gani bora kwako au kikundi chako kushiriki? Ni mbinu gani zinazofaa katika utamaduni wa jumuiya yako? Je, unawezaje kufikia zaidi ya jumuiya yako? Je, mjadala huu unawezaje kusababisha hatua?

A large, empty rounded rectangular box with a black border, intended for students to write their discussion notes or responses.

SESSION SEVEN

KARIBU

Je, una lengo gani leo? _____

MBINU ZA MCHOVYO - PLATING

Shule ya Culinary ni nini?

Shule inayofundisha sanaa na sayansi ya kupikia na maandalizi ya chakula.

Wanafunzi wanajifunza nini?

- Lishe
- Mbinu za Kupikia
- Kisu na Ujuzi wa Vifaa
- Usafi
- Usalama wa Chakula
- Mbinu za Plating



Mbinu za mchovy (plating) ni nini?

Sanaa ya kupanga, kupamba na kuwasilisha chakula kwa njia ambayo inaboresha rufaa yake ya kisani. **Mifano:** nyama kukata usawa, mifumo (textures) mbali mbali, rangi tofauti, mapambo (garnishes) ya vyakula, usawa wa kuona, sehemu ndogo, maumbo ya kuvutia, kujenga urefu, tabaka kuvutia, hakuna kufurika.

Why are plating techniques important?

Utafiti katika Taasisi ya Culinary ya Amerika uligundua kuwa watu hupima ladha ya chakula cha juu wakati imefunikwa vizuri. Utafiti mwingine katika Chuo Kikuu cha Keio nchini Japan uligundua kuwa muonekano mzuri unachochea hamu ya kula.

Le Présage Restaurant (lepresage.fr)

Hii ni Le Présage, Mgahawa wa Jua huko Marseille, Ufaransa. Chakula ni nishati ya jua iliyopikwa. Le Présage ni mgahawa wa kwanza wa jua huko Ulaya. Mpishi amejitolea kwa uendelevu.



SESSION SEVEN

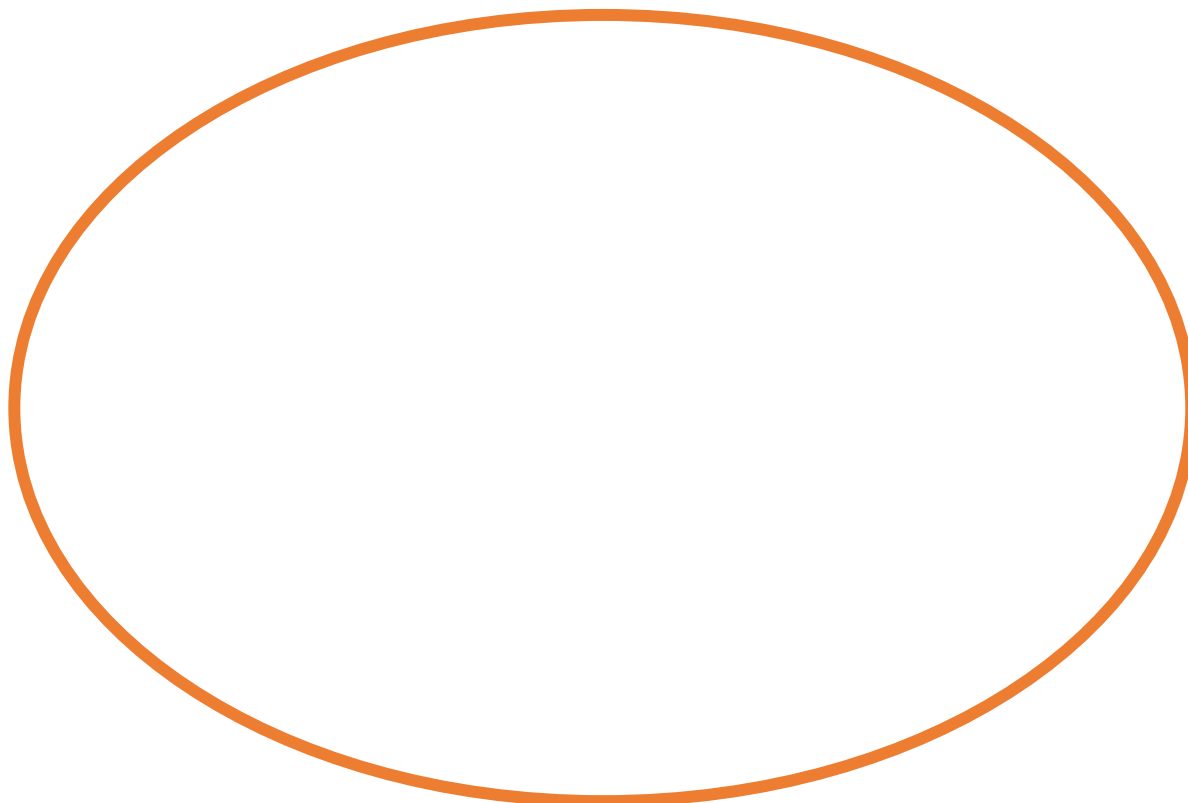
Chakula Kilichopikwa Kwa Jua Kilichotayarishwa Huko Le Présage



Photo Credit: Les Festins Photoniques

Chora chakula unachopenda kilichofunikwa kwa njia nzuri.

Jina la Chakula



SESSION SEVEN

MAHUSIANO YA KIMATAIFA

Ni Wapi Duniani?

Kutana na Alain kutoka kaskazini mwa Ufaransa (kwenye sayari ya Dunia) – Mpishi Wa Kutumia Jua (Solar Cook), Mvumbuzi (In-ventor) na Mmiliki wa SUNplicity

Alain anaishi Ufaransa. Ufaransa ni nchi kubwa zaidi katika Ulaya ya Magharibi. Ina mandhari tofauti, kutoka fukwe hadi misitu, hadi milima iliyo na theluji. Kaskazini mwa Ufaransa ni kilimo.



Alain anamnuu Augustin Mou-chot, mvumbuzi wa mkusanyaji wa jua wa parabolic. "Wakati tumechoma kila kitu tuli-chonacho, basi tutagundua kwamba tulikuwa na jua tangu



Anajielezea kama mvumbuzi, msanii, biashara ya jack-ya-yote, na mbuni. Ametumia miongo kadhaa kuvutiwa na nguvu ya jua, haswa miundo ya parabolic. Katika miaka ya Elfu moja mia tisa tisaini (1990). Alisoma moto ya Mbinguni, kitabu kuhusu tanuri - oveni za jua. Miundo katika kitabu ilimhamasisha Alain kuanza kutengeneza upishi wa sanduku la jua. Yote yalikuwa mapya sana, na alihisi hofu juu ya kupika na jua. Lakini hivi karibuni, alipata ujasiri na alifurahi na kujivunia kupika kwa nguvu ya jua. Alain alihisi bahati kwamba sasa alikuwa na habari njema (solar cooking) kuleta kwa watu na sayari!

Kwa miaka mitatu Alain aliishi katika misitu ya Costa Rica. Ni hapo ndipo alipoanza kupika chakula chake kila siku. Pia alioka mkate wake mwenyewe mara mbili kwa wiki. Aliiruhusu iinue kwenye tanuri - oveni bila waonyeshaji. Mara tu mkate ulipoinuka, aliongeza waakisi na kuoka mkate kwa nguvu ya jua.

Biashara yake, SUNplicity, inachukua muda wake mwingi. Yeye ni shauku sana juu ya kujenga oveni ya kina ya parabolic ambayo inayoweza kukunjwa, imara na kufanywa bila plastiki. Viwango vyake ni vya juu sana kutengeneza bidhaa ya kina ya parabolic ambayo inaweza kutumika salama sasa na katika siku zijazo.

Alain anatumai watu wanaweza kuanza kuelewa kwamba kwa kupikia jua, tuna nishati kubwa kwa uwekezaji mdogo sana. "Upikaji wa jua ni uhuru," anasema Alain. Chakula unachoweza kupika ni bora na nikizuri pia.

Anaona kwamba watu hawawezi kuwa wepesi kupitisha kupikia jua kwa sababu ya tabia za kitamaduni. Kwa mawasiliano bora na elimu, labda tunaweza kushinda vikwazo hivi na wote wanaanza kuchukua kipimo kamili cha uwezo unaotusubiri.

Utafiti ili kujua zaidi kuhusu hali ya hewa ya kaskazini mwa Ufaransa. Ni mara ngapi unaweza kupikia jua kaskazini mwa Ufaransa.

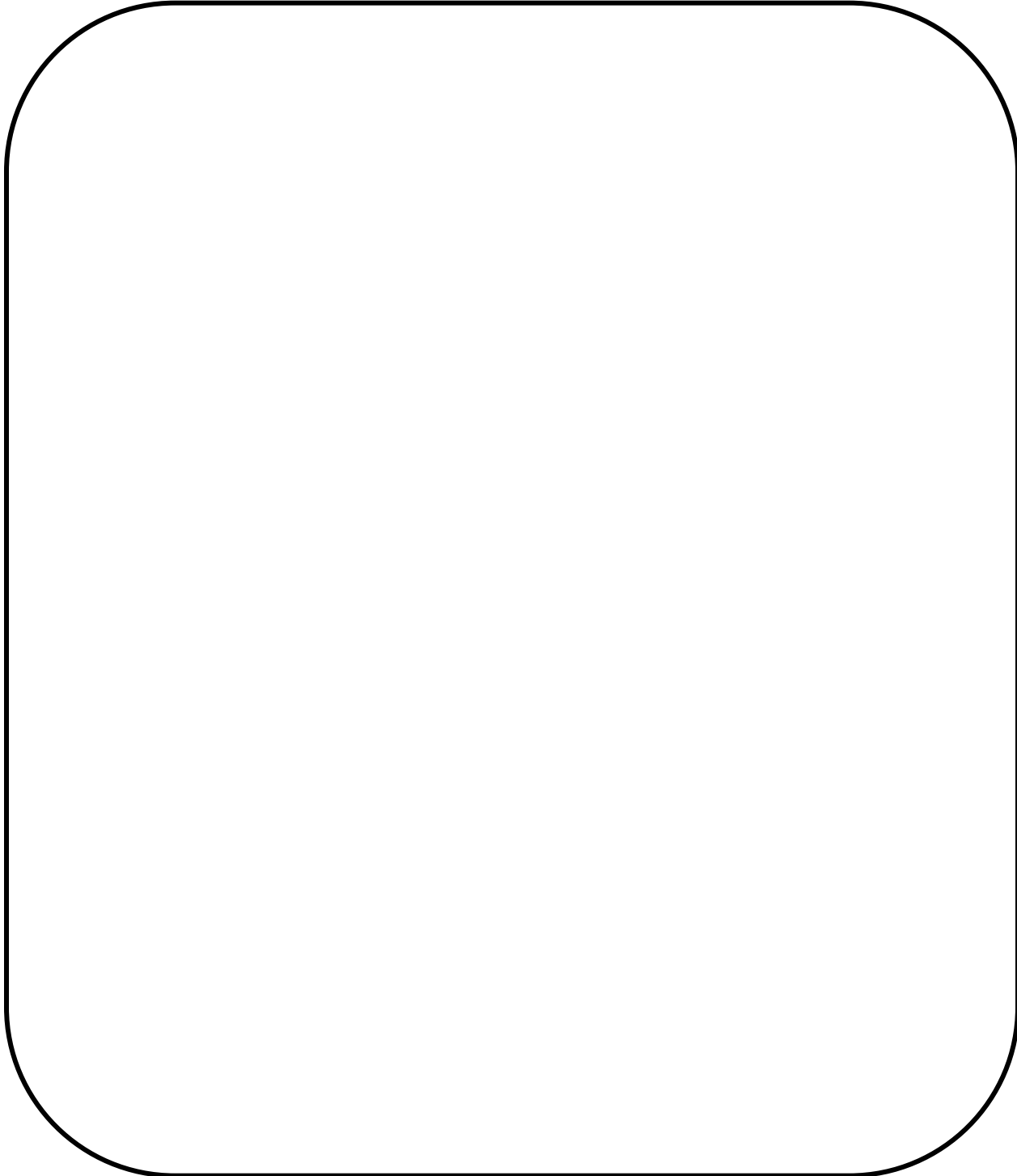
SESSION SEVEN

MJADALA

Tumia mada iliyopendekezwa au mojawapo ya chaguo lako.

Tumia ukurasa huu kwa vidokezo vya majadiliano ya kikundi chako.

Mada Iliyopendekezwa: Shirikiani kuandaa mawasilisho mafupi kwa ajili ya maadhimisho wakati wa Kikao hiki. Fanya kazi kwa jozi au vikundi vidogo. Shiriki kile umejifunza. Unda wimbo, densi, sanaa, au njia zingine za kusherehekea mafanikio.

A large, empty rounded rectangular box with a black border, intended for students to write or draw their discussion points.

SESSION EIGHT

KARIBU

Je, una lengo gani leo? _____

UPIKAJI WA KITAMADUNI

Umewahi jaribu kuonja chakula kutoka kwa utamaduni mwingine au nchi nyingine?

Chakula kilikuwa nini? Je, ulifurahia kula?

Je, ilikuwa tofauti gani na vyakula unavokula kawaida? Sema juu yake.

Watu ulimwenguni kote hula aina nyingi tofauti na za kipekee za vyakula. Kwa nini hivyo?

- Hali ya hewa na jiografia huathiri aina ya mazao ya chakula na miti ambayo inaweza kupandwa katika eneo.
- Huamua aina za wanyama wanaoweza kuishi porini au wanaoweza kufugwa kwa ajili ya chakula.

Taja baadhi ya mazao ya chakula na wanyama ambao ni kawaida katika eneo lako.

Katika historia, watu walijifunza kula vyakula vilivyopatikana kwa wingi au mahali walipoishi. Kwa sababu hii, mapishi ya kikanda yalitengenezwa karibu na vyanzo vya chakula vilivyochopatikana. Vyakula hivi vimekuwa sehemu ya utamaduni wa watu. Ni baadhi gani ya vyakula vyako vyakitamaduni?

Njia za kupikia zimeundwa kwa sababu kadhaa:

1. Mahali ambapo watu waliishi.
 2. Aina za kupikia ambazo zilikuwa nyingi.
 3. Aina za vyombo vya kupikia vinavyopatikana.
- Mbinu hizi zikawa sehemu muhimu za kitamaduni.

Mfano mmoja wa kuvutia wa kichocheo cha kipekee cha kikanda kilichofanywa kwa njia ya kuvutia sana ni Caldo De Piedra, au Supu ya Mawe. Huko Oaxaco, Mexico caldo de piedra ya kitamaduni imetengenezwa kwa karne nyingi.

Inatengenezwaje?

- Miamba huwekwa kwenye moto.
- Wakati huo huo viungo (samaki, nyanya, vitunguu, chile, mimea ya Mexican, dania, chumvi) na maji baridi huwekwa kwenye bakuli.
- Vibakuli vimetengenezwa kwa kibuyu cha jicara.
- Wakati miamba ya moto inapokanzwa sana, huwekwa kwenye bakuli.
- Maji kwenye kibuyu huanza kuchemka mara moja.

Kwa njia hii samaki na mboga huwashwa na kupikwa kwa ukamilifu!

Kutengeneza Caldo de Piedra

Mikopo ya Picha: Bénédicte Desrus



Vibakuli vilivyotengenezwa kwa kibuyu

SESSION EIGHT

Nchini Kenya, mdudu anayeitwa mchwa wenye mapawa nyeupe nichakula ambacho kwa kawaida huwekwa pamoja kwa sahani na ugali. Inatengenezwaje?

- Mchwa hukusanywa, na mabawa kuondolewa.
- Huoshwa, kutiwa chumvi na kukaushwa.
- Wanaweza kutumiwa ikiwa nzima au kusagwa.
- Zinaweza kusagwa na kuwa unga wa protini na kuongezwa kwa vyakula vingine.

Mchwa kwenye picha hukaushwa kwa jua kwa kutumia tanuri ya jua badala ya moto.



Photo credit – Didacus Odhiambo



Photo credit – Sheela Kiiskila

Mfano mwingine ni nyama ya kondoo kutoka Finland.

Inaitwa Särä. Imepikwa kwa njia sawa ya jadi kwa karne nyingi. Inatengenezwaje?

- Nyama ya kondoo changa huingizwa kwenye ya chumvi kwa saa tatu.
- Huwekwa kwenye birika iliyotengenezwa kwa mbao za birch.
- Huchomwa kwenye tanuri ya kuni kwa muda wa saa tisa.
- Inapoendelea kuchomwa, viazi huongezwa chini ya nyama.

Kwa karne nyingi, watu ulimwenguni kote wanaoishi karibu na chemchemi za maji moto za volkeno hutumia chanzo hiki cha joto chini ya ardhi kwa kupikia polepole. Joto ni laini na thabiti. Hii inaathari ya kulainisha nyama na kuchanganya ladha kwa njia isiyo ya kawaida. Kwenye visiwa vya Azores vya Ureno, kitoweo maarufu cha huko hutengenezwa kwa kupikwa polepole karibu na chemchemi za maji moto. Inatengenezwaje?

- Nyama na mboga huwekwa kwenye sufuria yenye kifuniko.
- Chungu huzikwa chini karibu na chemchemi za maji moto za volkeno.
- Mchanga inatundikwa juu ya shimo.
- Joto ya kupikia ni sawa karibu 100°C.
- Kitoweo hupikwa kwa saa 6 – 8.



Chakula ni sehemu muhimu ya maisha yetu na utamaduni wetu. Inahusishwa na matukio muhimu katika maisha yetu na sherehe za kitamaduni au za kidini. Kushiriki chakula pamoja nawengine hutuwezesha kufurahia chakula pamoja na mazungumzo na labda muziki, dansi na burudani.

Pengine unaweza kufikiria aina nyingi za vyakula ambavyo ni sehemu maalum ya mila ya familia yako. Shirikianeni ni vyakula gani hivyo na jinsi vinavyotayarishwa.

SESSION EIGHT

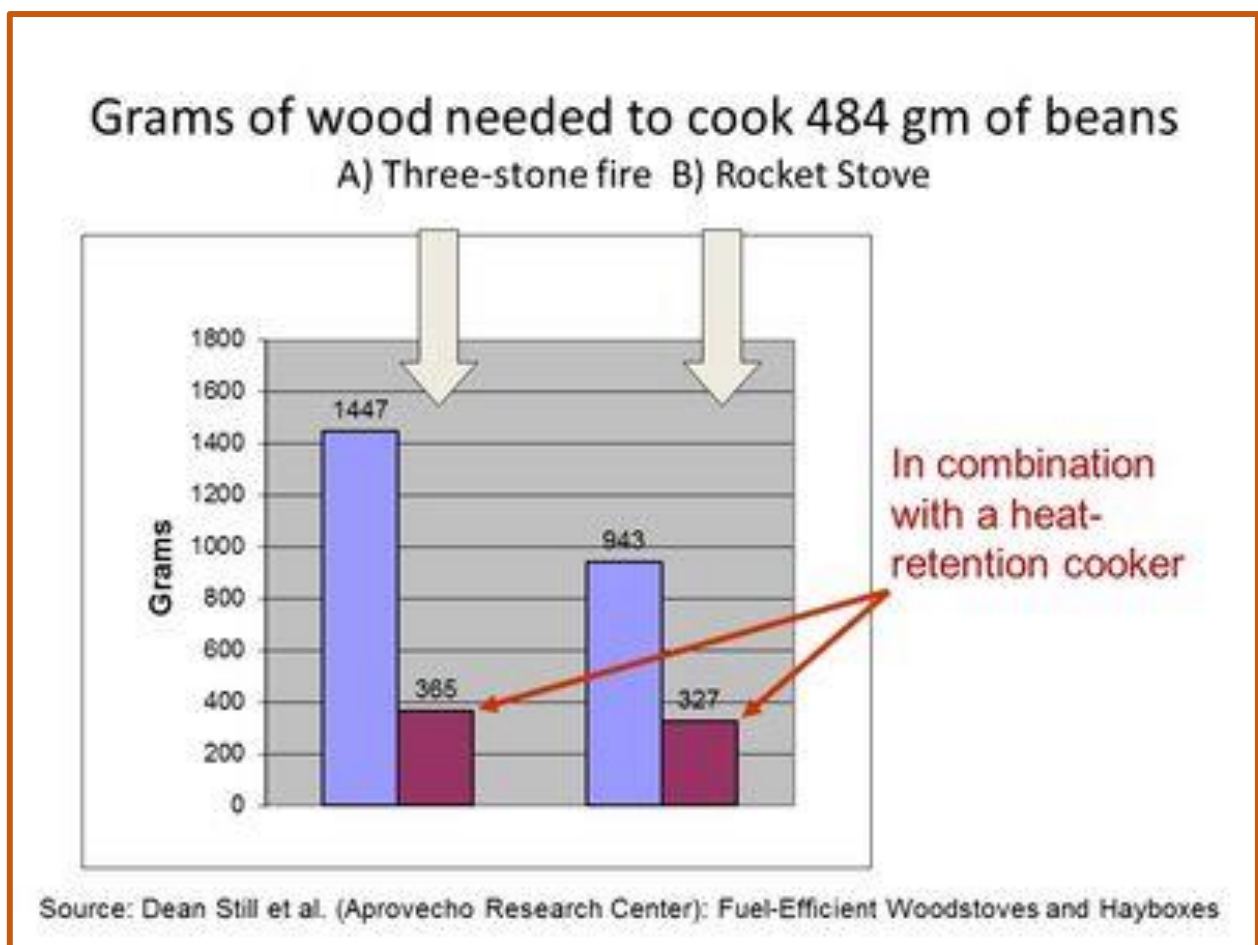
MAFUTA YA KUPIKA NA KUPIKIA UNGANISHI

Kwa sehemu kubwa ya historia ya wanadamu, kupikia kulifanyika kwa moto wazi wa kuni zinazowaka. Kujifunza kutumia moto kupika chakula ilikuwa ujuzi muhimu sana kwa wanadamu wamapema. Ingawa vyakula vingine viliendelea kuliwa vikiwa vibichi, vyakula vilivyopikwa vilikuwa muhimu sana kwa sababu kadhaa.

- Joto hurahisisha chakula kusaga.
- Chakula kilichopashwa joto hutoa kalori zaidi na hutoa nishati ya ziada kwa wanadamu.
- Joto huua vimelea vya magonjwa, au vijidudu vinavyosababisha magonjwa. Viini hivi vinaweza kuwa katika vyakula vibichi, maziwa au maji chafu.
- Joto hufanya baadhi ya vyakula vigumu kuliwa ambavyo havingekuwa vinginevyo.

Moto kutoka kwa kuni bado hutumiwa sana kwa kupikia. Mbinu nyingine ya kupikia ni pamojana: mkaa, kinyesi cha wanyama, gesi asilia, biogas, propani, umeme na mwanga wa jua. Je, unafahamu mbinu ngapi kati ya hizo? Umewahi kupikia ngapi?

Je! Njia ya Kupikia Jumuishi ni nini? Ni njia ya kupikia inayotumia nishati ya jua na joto lililohifadhiwa pamoja na mbinu ya kitamaduni inapohitajika. Njia hii inaokoa mafuta, pesa na mali asili.



SESSION EIGHT



Mnawezaje kutumia mifano ifuatayo **pamoja** kuandaa chakula? Andika au chora mawazo yako.

Tanuri ya Jua na Kikapu cha Joto Kilichohifadhiwa

Moto wa kuni na Tanuri ya jua

Juu ya Jiko la Umeme na Kikapu cha Joto Kilichohifadhiwa

Moto wa Mkaa, Tanuri ya Jua na Kikapu cha Joto Iliyohifadhiwa

SESSION EIGHT

MAHUSIANO YA KIMATAIFA

Where in the World?

Kutana na Matteo kutoka Italia – Mpishi wa Tanuri, Mhandisi, na Mvumbuzi

Tunafikiri Matteo ni mtaalamu wa kubuni jiko la jua! Angalia baadhi ya ubunifu wake! Je, unaweza kubuni jiko lako mwenyewe la sola?



Matteo ni mhandisi wa mitambo ambaye huunda mifumo ya joto. Italia ni peninsula yenye umbo la buti katika sehemu ya kusini ya Uropa. Imezungukwa na Bahari ya Adriatic, Bahari ya Tyrrhenian, na Bahari ya Mediterania.



Mbali na kazi yake kitaaluma, Matteo anaendesha warsha za kupikia kwa jua na amewasilisha kwenye mikutano ya nishati na mazingira. Matteo anapenda kubuni miundo yake ya jiko la jua.

Matteo aligundua upishi wa jua mnamo 2015 kwa bahati. Alikuwa akifanya kazi ya kuunda kitovu cha nishati ya jua alipokutana na video ya YouTube ya upishi wa jua. Mwanzoni, hakuvutiwa hivyo. Alifikiri ilikuwa ni burudani ya busara tu au wakati uliopita. Kwa miezi kadhaa, hakufikiria hata juu ya kupikia kwa jua. Lakini basi siku moja, aliamua kubadilisha tanuri yake ya jua kuwa tanuri kwa ajili ya kujifurahisha tu.

Alitengeneza kahawa. Ilikuwa ni mafanikio. Kisha akatengeneza pasta. Ilikuwa ni mafanikio pia! Na tangu wakati huo, hajaacha kubuni na kupika kwa jua!

Matteo anapenda kupika vyakula vitamu vya Kiitaliano, lakini matukio yake mengi ya upishi nipamoja na keki na kitindamlo (desserts). Kwa nini unauliza? Hiyo ni kwa sababu watoto wake wanapenda, na kila wakati huomba chipsi zake tamu zilizopikwa kwa jua!

Matteo anaamini kwamba uhandisi ni lazima uhudumie mwanadamu na mazingira. Anasema, "Kupika kwa kutumia jua kumeniruhusu kugundua jambo la ajabu: jua hufanya chakula chetuku-kua na jua linaweza kukipika. Ni mduara kamili. Kupika kwa kutumia jua ni polepole, na katika ulimwengu wenye machafuko na shida, huu ni utajiri mkubwa.

Matteo anafurahia kushiriki mapenzi yake ya upishi unaotumia miale ya jua, miundo yake ya ubunifu ya tanuri, vyakula vyake vilivyopikwa vyema vya miale ya jua, na hali ya kupendeza ya ucheshi na watu wengi kadiri awezavyo.

Utafiti wa kujua zaidi kuhusu hali ya hewa ya Mkoa wa Rimini nchini Italia. Ni mara ngapi unaweza kupika sola hapa?

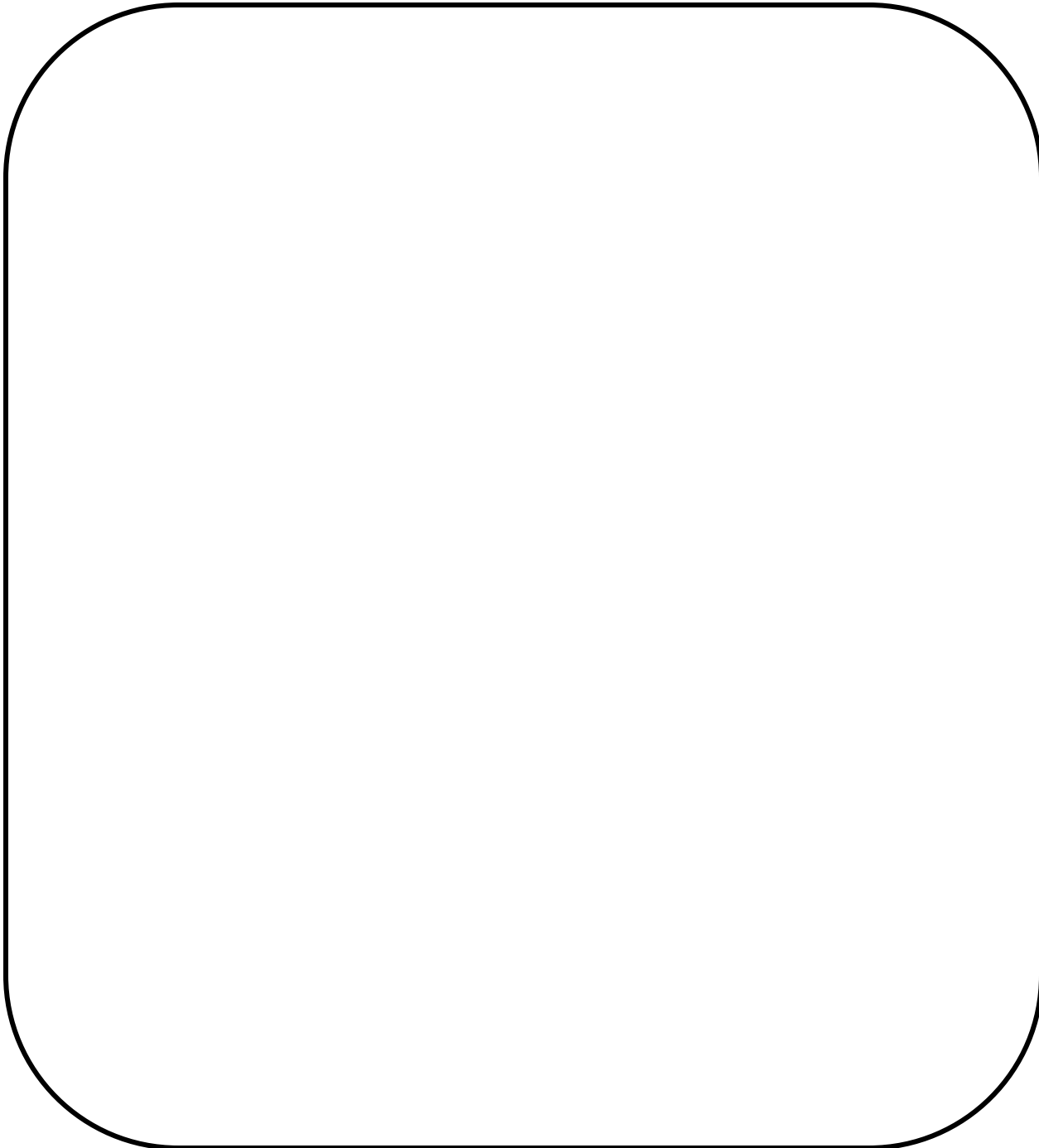
SESSION EIGHT

MJADALA

Tumia mada iliyopendekezwa au mojawapo ya chaguo lako.

Tumia ukurasa huu kwa vidokezo vya majadiliano ya kikundi chako.

Mada Iliyopendekezwa: Je, kupikia kwa kutumia nishati ya jua na joto lililobaki kunaweza kutoa fursa ya biashara? Jadili chaguzi kama vile kuuza keki, kuuza oveni, kufundisha juu ya nishati ya jua na kupika kwa joto lisiloweza kuepukika, n.k. Je, mjadala huu unawezaje kuleta hatua?

A large, empty rounded rectangle with a black border, intended for a group discussion or debate.

Focus Group POST Questionnaire for Haines Solar Cooker

1. Name of Surveyor, and mobile number.
2. Location of Focus Group.
3. Focus group member's name and number on solar cooker.
4. Here is a list of features of the Haines Solar Cooker. Please rate their importance to you.

Feature: _____	<u>Very important</u>	<u>Important</u>	<u>Not important or Disagree</u>
Saves fuel			
No smoke			
Saves time			
Cooks large quantities			
Can Use "Stacked" pots			
Folds up for storage			
Looks good			
Easy to set up			
Easy to use			
Used with basket to keep foods hot			
Cooks in windy conditions			
Pasteurizes Jerry can of water			
Heats water for bathing			
Other (specify)			
<u>Possible Shortcomings</u>			
Unstable in windy conditions			
Cooks too slow			
Complicated to operate			
Difficult to set up			
Difficult to use			
Looks unattractive			

1. Do you prefer solar to cooking with firewood or charcoal?
2. Would you recommend it to a friend?
3. If the price was reasonable, would you buy a solar cooker?
4. What do you dislike?
5. How can the solar cooker be improved?

MWONGOZO WA KUPIKA KWA JUA

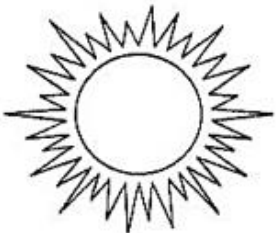
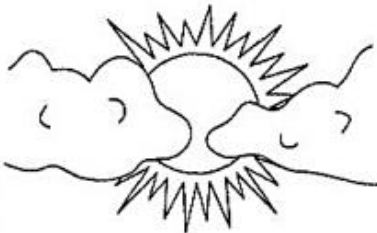
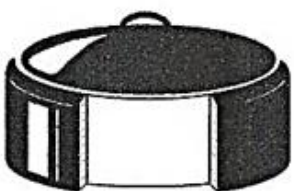
	Kupikia Haraka	Kupika polepole
Wakati wa Mwaka Muda wa Siku		
Kiasi cha Jua		
Kasi ya Upepo		
Unene wa Chungu		
Kiasi cha Chakula Ukubwa wa Chakula		
Kiasi cha Maji		

Chart Resource: solarcooking.org Translation: SEP

INAKADIRIWA WAKATI WA KUPIKIA - KULINGANA NA KILO 2 AU PAUNI 4 ZA CHAKULA (siku yenye jua)

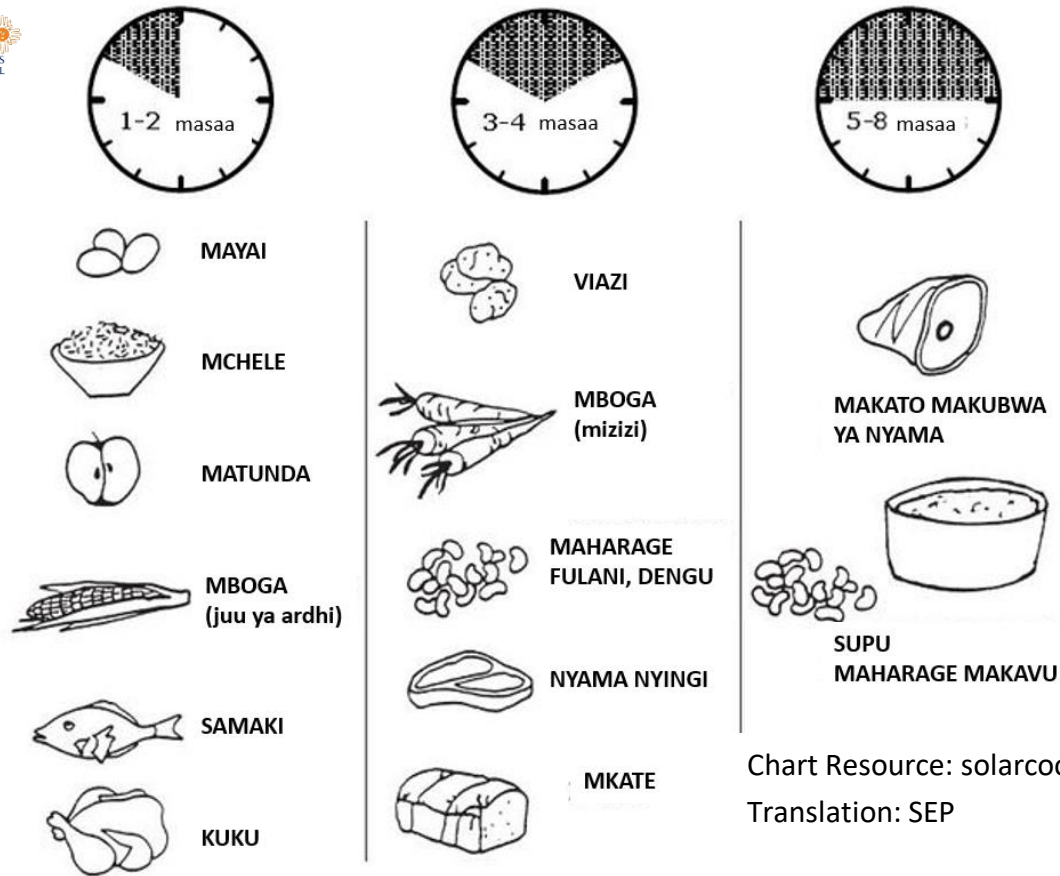


Chart Resource: solarcooking.org

Translation: SEP

MAPENDEKEZO YA USALAMA

- Kupika kwa jua kunahitaji jua. Usipika siku ya mawingu.
- Usiangalie jua moja kwa moja. Usiangalie mwako wa kiakisi. Vaa miwani ya jua kwa ulinzi wa ziada.
- Mwangaza wa jua unaozingatia unaweza kusababisha kuchoma au moto. Weka viakisi kulenga kwenye nafasi ya kupikia. Funika au weka viakisi mbali wakati havitumiki.
- Tumia mitts ya oveni. Jihadharini na vinywaji vya moto na mvuke.
- Hakikisha chakula kimepikwa vizuri. Kipimajoto kinaweza kutumika kuangalia.
- Fanya mazoezi ya usafi wakati wa kuandaa chakula.



Tumia ukurasa huu kwa vidokezo au mawazo ya mapishi.

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Tumia ukurasa huu kwa vidokezo au mawazo ya mapishi.

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EXTENDED LEARNING OPPORTUNITIES (ELO)

Read through the wide variety of Extended Learning Opportunities. Find one that interests you and do it! Bring a friend along or have your family involved. Make the activity inter-generational. Be an ambassador for clean cooking and champion of the Sustainable Development Goals! Then think of your own idea and add it to our list! Let us know how you used the ELO in your classroom or community. We are better together!

SCIENCE

- Experiment with different heat traps. Discover the best heat traps for a reflective panel cooker.
- How does matter convert light energy to heat energy? Draw a diagram that shows the process?
- Make solar cooking/cookers the focus of a science fair experiment.
- Find the optimal height for the pot from the base of a panel oven to maximize the oven's efficiency.
- Make two Copenhagen reflective solar cookers using two different reflective materials. Design an experiment to see if the reflective material makes a difference when heating water. Chart the results.
- Create a new game related to solar cooking concepts. List materials and directions for making the game. Write the instructions for play.
- Research Haiti and their weather patterns of the past 10 years. What are the key environmental problem areas? How can solar cooking help?
- Research phase changing materials. How can they affect solar cooking? Create a materials list with cost and total to harness the energy of phase changing materials safely. How can the phase changing materials help the world? How can they be used for solar cooking?

TECHNOLOGY/GAMING

- Develop a superhero series for solar cooking. Champion of the Planet. The hero uses science and the principles of solar cooking as his or her superpowers. Create a comic book style story of your superhero.
- How can 3D printing be used to improve solar cookers?
- Solar cooking has potential to be included in video games. Add the concept to an existing game. Use a laser light to ray trace the angles of the sunlight. Develop the ray tracing into the same video game.
- Create an app to connect solar cooker manufacturers and enthusiasts from around the world to funding sources through sustainable development projects.
- Develop a QR code to connect solar cooking enthusiasts with school classrooms, where schools interested in a virtual solar cooking program can easily find interested groups to share the benefits of solar cooking.
- Use a video camera to record a chat with a solar cooker, Luther Kreuger style. Watch two YouTube videos from the Big Blue Sun Museum and mimic the interviewing style by creating your own solar cooker video to add to the history of solar cooking.
- Create a multimedia journal for a podcast on the sounds of solar cooking. Close your eyes and hear solar cooking happening.
- Develop a PowerPoint presentation from audio, images, movies to represent the feeling of solar cooking.
- Design a window solar cooker for home using auto cad software. Research commercial kitchens and apply the same concepts to develop a commercial solar cooker.

ENGINEERING

- Draw an outdoor solar cooker that blends into the landscape in color and shape. It must still function.
- Draw a solar oven with complete dimensions. List five steps that must be completed to recreate the oven.
- Pair learners. One has a photo and the other a plain piece of paper and pencil. Sit back-to-back and have one instruct the other to draw a picture of what they see in their photo. After 5 minutes, compare the photo with the drawing. Reverse the roles and repeat. How does this exercise relate to solar cooking?
- Skype or Zoom with a class from another country to talk about solar cooking and oven designs.
- Design a model solar cooker to use for publicity. Make it to scale for a doll. Develop a story of why solar cookers are sustainable. Send it to Mattel.
- Design a solar cooker that works from found or discarded items that can be upcycled. No new materials are allowed. How difficult or easy is it to find items that make a functional solar cooker?
- Design a community that uses solar thermal energy for heating homes, water, and cooking food. Highlight the green features of the community and estimate the energy savings.
- Design an indoor solar cooker that works with solar panels on the roof. Draw the path of sun rays into the home.

- Create a simple engineering design challenge using a solar cooker. Improve an existing solar oven design to increase its ability to heat water. Test your new design against the original design. Record your results.

ENTREPRENEURSHIP

- Create a color print ad for a solar cooker for a specific sun rich area of the world.
- From makerspace to manufacturing using solar cookers. Create an engineering design challenge that includes a time and budget limit. How does this affect the way you approach your project?
- Use the engineering design process to come up with a product or service related to solar cooking or solar cooking education that is not currently available in your community.
- Make cookies in the solar oven and sell as a fundraiser for a nonprofit you support.
- Pick a style of solar oven and list the benefits and features of the oven. Develop an add to market the oven. Develop a jingle and slogan for the ad.
- Promote Corporate Social Responsibility by creating entrepreneurship opportunities using solar cookers for sustainable development. Investigate solar cookers as tools for micro funding and mutual solidarity projects.
- Develop a solar cooking business plan, complete with business name and logo.

ART

- Take a selfie. Use the filters and editing features to make a series of three self-portraits, altering the portrait using the colors of visible light. Add a concave or convex lens view. Label the Self Portrait "THIS IS THE FACE OF CHANGE: I BELIEVE...."
- Use the colors of visible light (red, orange, yellow, blue, green, and violet) to create a landscape that includes a solar cooker. Add a black frame to your piece.
- Practice shading, using the sun at various times of day on a solar cooker. Add the shadows and length of shadow appropriately. Make a series of six or nine small sketches.
- Find a photo of a masterpiece from a famous artist such as Renoir, Degas, or Van Gough. Add a solar cooker to the piece that looks like it belongs there.
- Design an artistic cover for a solar cooker that protects it from rain and other weather.
- Food art. Make the plate match the magazine. Investigate plating techniques learned in culinary school. Try out plating techniques with meals you cook. Include solar cooked meals in this activity.
- Create a colorful line of accessories for solar cooking.
- Make a model of a reflective panel solar cooker and decorate the outside panels.
- Make an artistic reflective panel cooker that heats to 200 degrees F.
- Make a mixed media art presentation using all four types of solar cookers.
- Sketch a solar cooker from a photo. Shade correctly for the location of the sun. Add your family solar cooking.
- Develop a coloring page for the elementary school students. Present the page and explain how a solar cooker works. Have the students add the sun and color the picture.

MATH

- Introduce tessellations (tiling) using the drawings of M.C. Escher, and online research. Create a solar cooker using geometric shapes: regular and irregular polygons, triangles, squares, and hexagons.
- Learn budgeting, financial literacy and practical math through building a solar cooker, develop a materials list, cost, and budget.
- Devise a formula to represent exponential growth. If each person in the session told one person about one solar cooking, how many people would be reached each day? After 7 sessions? What if each of their friends told one more friend? How many more people would learn about solar cooking?
- Calculate the fuel cost saved per month by using a community solar cooker 50% of the time cooking two meals a day for 100 people. Recalculate for using the oven 50% of the time for 200 people eating three meals a day.
- Go outside on a sunny day. Measure the angles of the shadow of a building once an hour for 3 hours. Note the changes and position of the sun. Use the shapes of the shadows to create an abstract art piece.
- Research sundials. Make a sundial to show the time of day. Use your knowledge of sun and shadows to measure the angles, include the latitude of your location.
- Learn how to draw a parabola and find the focal point.
- Learn about angles and ray tracing using a low mW laser. Place the laser pointer directly at the back of the cooker. Use graph paper to trace the path of the light as it reflects off the cooker's surface. Measure the angle formed. Label the incident ray and reflected ray. Do this several times starting at different positions.

HEALTH, FOOD and NUTRITION

- What is your favorite color? How does color influence your emotion? How does light affect your favorite color?
- Express culture through food, share with others using the solar cooker.
- What is food insecurity? How can a solar food dryer help? Read Juana's story from Mexico and see how solar cooking and drying can extend the life of fresh foods.
- Discuss a communal solar food drier with organizations in your community. Survey people to find out their knowledge of solar drying and their interest in learning to use a communal drier. Make a plan of action.
- List the ingredients of your most recent dinner. List all the ingredients and the plant or animal they come from. Chart or graph your results.
- What is food insecurity? How can solar cooking and drying help?
- Introduce solar cooking to your shop class. Make a box oven and post the results. Cook foods.
- Introduce solar cooking to the food science/home economics class. Guide students in preparing a simple recipe for the cookers.
- Research and investigate to determine if solar cooked food changes the nutrients from your traditional method of cooking.
- Water pasteurization is a problem in many areas. How can solar cookers be used to make water safe to drink?
- Research some nutrient-dense foods grown in your area. What are they? Can they be solar dried?

CAREER/COMMUNITY

- Make a list of five questions about solar cooking. Find a solar cook to interview and write an article for the newspaper.
- Create a survey that helps you discover people's interests in solar cooking. What are the difficulties of introducing a new method of cooking? What are the benefits?
- Create a Public Service Announcement about solar cooking and benefits. Send to the local media.
- Interview a solar oven manufacturer. What are job qualifications for a marketing position? How did the owner make a business from solar ovens? Investigate careers in weather. Track the times for sunrise and sunset, peak sun elevation angle, cloud cover and wind velocity. What conditions are best for solar cooking? Interview a meteorologist. What are job qualifications and availability?
- Investigate jobs related to the field of solar energy and locations. List the top five jobs of interest, salaries, educational requirements, and potential growth of the field.
- Develop a solar cooking youth group. Meet to cook new foods and share foods. Invite new members.
- Create a business model based upon a making and selling box ovens made of locally sourced materials. Complete the Business Model Canvas.
- Write a criterion for a solar cooking badge for girl/boy scouts. Discuss the idea with a troop leader. Design the badge and show the scout leader.

GEOGRAPHY/ HISTORY

- Make a compass rose on the map. What are the positions of the sun and direction for sun rich areas to solar cook north and south of the equator?
- Make a timeline for history of solar cooking. Select one event to research for a History Day project.
- How can solar ovens help in times of disaster? Name 2 regions in the world that are sun rich and located on a tectonic fault. How can solar cooking help?
- Pick 2 numbers between -90 to 90 and -180 to 80. Using the latitude and longitude grid, find the location on a map. Research the location and culture. Name the top 3 foods. Can they solar cook in their region? If so, which type of oven would be best? Now find the latitude, and longitude of your hometown. Write it down. How many miles are you from the first location you selected? Compare the two locations' weather, culture, and foods.
- Look at a topographical map of your town. Where is the best place to find a large community solar cooker for everyone to use? Why?
- Make an exhibit explaining the diverse cultural cooking methods in the world. In the sun rich regions, explain how solar cooking could have a positive impact on the resources of the target area.
- Research celebrities known for environmental awareness and activism. Where do they live? List the latitude and longitude and name. Which ones are the best suited to solar cooking? PM their media asking if they have ever used a solar cooker.
- Continue the Learning: Look for successful programs and replicate the framework and model for solar cooking.

LANGUAGE ARTS

- STORY TIME: Create a Compelling Story Involving a Sun Rich Region of the World and Solar Cooking.
- Create a word search with key vocabulary words from Solar cooking: Direct, Absorb, Retain, Eat, Enjoy, Engineer, Entrepreneurship, Science, Technology, Art, Math, Solar Cooking, Sun, Shadows, Panel Cooker, Box Oven, Parabolic Burner, Food.
- See how many words can be made from "sustainable development goals"? Use the words to write a story.
- Write a poem about solar cooking (Haiku or Limerick) or the colors of a rainbow. Add a drawing.
- Take an article about solar cooking and rewrite it using figurative language, add more description and details to make the article more dramatic and interesting.
- Personalize solar cooking by telling a story from your life. Add solar cooking to your story and make each meal in the solar cooker. Tell about the challenges, what other people said, and how you felt trying something new. Tell your story to someone.
- Write a story about a family that cooks using a three stone fire until they learn about solar cooking.
- Chain Message: Whisper "you can have fun and cook food with the sun and write a funny pun". Pass it along to 10 people and see what the last message is!
- Using sign language, sign a story about solar cooking.
- Offer to translate a solar cooking video on YouTube into another language
- Look up solar cooking social media groups in other countries and learn more details from a native speaker.
- Read the story, Stone Soup. Write a play about this story. Change the setting of the story to your community. Make the characters into puppets. Perform the puppet show with costumes and props on a puppet stage.

CULTURE/ENVIRONMENT/ SUSTAINABILITY

- Investigate the UN SDGs. Find 3 that can benefit from using solar cookers to solve world problems.
- Make some noise: Use social media to spread the word of solar cooking.
- Why are a variety of trees important to an ecosystem? Name 5 ways we benefit from the trees, besides wood products and fuel. Organize a tree planting day (Arbor or Earth Day are a good start).
- Make an online environmental club (Facebook, Instagram, etc.). Build following to 3,000 people. Make two-minute videos once a month on important local environmental topics. Interview a guest speaker, blog and be visible. Bring new technologies to light, like solar cooking.
- Investigate biogas and composting. Keep a container in the kitchen/cafeteria to collect food scraps daily. Start a compost bin outdoors. How does this practice benefit Earth's Ecosystem? Use the compost
- Demonstrate how to make a simple reflective panel solar oven. Show how it can be used to purify water.
- Identify four countries that have a shortage of cooking fuels. How could solar cooking help?
- Create a scavenger hunt to find plants, trees, and flowers. Discuss deforestation, erosion and places that use wood to cook their meals. Give clues to discover another way to help our environment, using a solar cooker to reduce deforestation and erosion.
- Name two world problems solar cooking can help solve.
- Research the United Nation's Sustainable Development Goals. Pick four and write how solar cooking fits into that category. What is a sustainability mindset and how does solar cooking fit in? What affects the social, economic, and environmental pillars?
- Research what happens to the environment when trees are cut down to use for cooking fires. Name the top three areas in the world where deforestation and soil erosion are a problem. Name the top 2 states in the United States where deforestation is a problem. How can using solar ovens decrease environmental problems? Do the same with Countries, how can solar cooking help slow deforestation?
- Research and explain the uses of paraffin, charcoal, LPG and other fuels for cooking. What are the long-term environmental effects and how does solar cooking fit into the solution?
- Consider attending a local meeting: civic groups and school clubs (Rotary, Library, churches, farmers market, health fair, youth group, environmental group, teacher meeting, etc.). Ask to be a speaker for 15 minutes about the benefits of solar cooking. Demonstrate the solar oven and DARE Method.
- Research fireless cooking solutions other than solar cookers. What are integrated clean cooking solutions? Consider making a heat retention basket and to extend the cooking and also keep food warm.

Glossary of Terms

absorb – to take in, to transform radiant energy into a different form, especially with a resulting rise in temperature

axis – the imaginary line through Earth from north to south around which Earth rotates, or spins

box oven – solar cooking appliance in which the cooking space is contained inside a box. Usually, a box oven is insulated on all sides except one transparent side through which light enters. An exception to this is a box with multiple transparent sides

electromagnetic radiation – a kind of radiation in which electric and magnetic fields vary simultaneously

carbon sequestration – a natural or artificial process by which carbon dioxide is removed from the atmosphere and stored in solid or liquid form

concentric – circles, arcs, or other shapes which share the same center, the larger completely surrounding the smaller

convert – to cause to change in form

ecosystem – all the living things in an area that interact with one another and their surroundings

engineer - a person who designs, builds, or maintains engines, machines, or public works

engineering design process - an open-ended method of problem solving that cycles through a process of imagining, researching, designing, constructing, evaluating, and improving

equator – imaginary line around Earth equal distance from both poles; divides Earth into northern hemisphere and southern hemisphere

evacuated tube – a tube that consists of two layers of borosilicate glass between which a vacuum is created by removing the air

greenhouse effect – the trapping of the sun’s warmth in a planet’s lower atmosphere

heat – the flow of thermal energy

infrared – part of the electromagnetic spectrum; the wavelengths emitted by heated objects

kinetic energy – the energy an object has because of its motion

latitude – imaginary lines around Earth parallel to the equator, identifying locations north and south

longitude – imaginary lines running from north pole to south pole, identifying locations east and west

opaque – not able to be seen through

reflective panel oven – a type of solar oven that consists of reflective panels surrounding a cooking space made of black cookware and a heat trap

parabola – a symmetrical open plane curve formed by the intersection of a cone with a plane parallel to its side

parabolic burner – a type of solar cooking appliance that uses the shape of a reflective parabola to direct incoming light to a focal point

radiation – the transmission of energy in the form of waves

reflect – bouncing back of a light ray after hitting a surface

refract – bending of light waves as they change direction because of change of speed

retain – keep something in place

revolution – one complete journey of Earth around the sun that takes approximately 365 ¼ days

rotation – one complete spin, or turn, of Earth on its axis that takes approximately twenty four hours

solar energy – energy generated by the sun

sunlight – waves of electromagnetic radiation that pass through the atmosphere and reach Earth: visible light, ultraviolet light, and infrared light

Sustainable Development Goals – goals adopted by all United Nations Member States in 2015 to end poverty, protect the planet, and ensure all people enjoy peace and prosperity by 2030

sustainability – use of resources in a way that helps to keep natural, social and economic resources in balance

thermal energy – energy due to motion of particles in a system

transfer – to move from one place to another

transform – to change forms

translucent – allowing some light to pass through but not in a way that allows objects on the opposite side to appear clearly

transmit – allow to pass through a medium

transparent – allowing light to pass through so that objects can be clearly seen

tropical – a climate that is frost free with temperatures high enough to support year round plant growth

ultraviolet – part of the electromagnetic spectrum

visible light – the part of the electromagnetic spectrum that is made of visible bands of color that allow us to see

weather – the state of the atmosphere based on heat or cold, wetness or dryness, calm or storm, clearness or cloudiness

zero-emission – device, process or energy source that does not produce waste that pollutes the environment

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Unless otherwise noted, photos sourced through creative commons.

Where in the World? maps sourced through Wikimedia.org

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Solar Cooker Adoption and Impact Survey (SEP Modified)

PART 2: POST DISTRIBUTION DATA

Have participant fill this out after having used the cooker for 4 to 6 weeks.

For the Surveyor to Answer:

Date _____ City, Country Latitude and Longitude coordinates? _____

Name of Organization(s) Providing Solar Cooker _____

What type of solar cooker is being used?

Panel Box Evacuated Tube Parabolic Other _____

Notes on cooker and cookware condition, etc. _____

For Training Participant/Cook to Answer:

Name or Identification number: _____

How many times per week do you cook in your solar cooker? _____

Would you recommend it to a friend? YES NO Why or why not? _____

How long have you had your solar cooker? _____

Did you contribute something (money, goods, work) for your solar cooker? YES NO

How many dishes do you cook at one time in the cooker? _____

What other cooking devices do you use (including retained-heat cookers)? _____

What are the top 3 fuels you use? Please put 1 next to the most used, 2 next to occasional use, and 3 next to the least used. **Circle *all* of the fuels you use.**

___ Charcoal

___ Electricity

___ Petroleum

___ Crop waste

___ Natural Gas

___ Coal

___ Dung

___ Biogas

___ BioMass

___ LPG (Liquefied Gas)

___ Solar Thermal

___ Wood

___ Fireless Cooker Basket

___ Kerosene

___ Other _____

Solar Cooker Adoption and Impact Survey (SEP Modified)

How do you obtain your primary fuel?

List the fuels you use that you *DO NOT pay cash money for*? Next to each fuel listed, estimate the quantity you use per week. (kilograms or other appropriate measure)

List the fuels you use that you *DO pay cash money for*? Use kilograms or other appropriate quantifier. List each type and quantity.

How much money do you spend on fuel per week? (Identify currency.) _____

Do you spend less money on fuel by using a solar cooker? YES NO

DATA COLLECTION CHART

JINA LAKO

Rekodi matokeo ya kupikia yako. Chukua picha wazi ya ukurasa utakapokamilika. Shiriki kwenye kikundi cha WhatsApp. Mwalimu anaweza kutengeneza nakala za ziada za chati ikihitajika.

Tarehe	Umepika chakula gani?	Hali ya hewa ilikuwaje? (Chagua moja au zaidi.)	Wakati wa kupika	Je, unawapikia watu wangapi?	Ulitumia njia gani ya kupikia?	Kadiria matokeo yako. 1 – 5 1 Mbaya Zaidi / 5 Bora zaidi Ongeza maoni.
		  				

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