

Radio Science serial Episode-17

Entitled “Paani: Ekta Interesting aro Unique Chemical (Water: The interesting and Unique Chemical)”

Sustainable development

Translator: Benjongtoshi Jamir

#####Title song/signature tune#####

Morom saathikan! Ami kan sob jaane paani kimaan zaroori aseh. Etu karuneh aro oku kotha alaag kobo nalakeh. Hoilebhi moikan kitiyabi nabhapeh paani laga last drop tak kimaan zaroori aseh.

#####Title song/signature tune#####

Scene: Avilie bathroom teh khosol kuri aseh. Gaana kuri thaki aseh. Okot samaay teh tap para paani rukhi jai. Taar tar laga amma ke mathi aseh.....

Avilie: Mummy.....Mummmyyyo!...mummy....bathroom teh paani nai. Moi kineka khosol kuribo....chouuu morom para chukha para paani anitibi na.

Mother: Avilie...sabhi toh... Apuni nijor laga galti hi aseh, tap toh poila para khuli kena hi thakishe...paani sob felai tahakishe...paani nathakha nahoi hoilebi paani khotom hua hi ase. Moikhan laga biya habits para problem hi bonai.

Father: Avilie! Apuni hotai eneka hi kurei. Itu para sob dukh pai thakeh. Moi hotai koi thakeh nahoi ki khosol nakureh ageh baldin(bucket) teh paani bhorta kuribi hoilebhi apuni kitia hunei na? Apuni toh nahobo ho, koileh bhi bodli nakureh ho apuni.

Avilie: Oieeeeeeeee...kunbi hune aseh na nai ho?? moike paani baldin ekta ani dibole aseh naaa khosol nakuri kena olai diboleh mun aseh. Jaane ho papa maths laga professor aseh, hotai loss aro profit hi

calculate kuri thakeh!. Aro amma bhi hotai paani supply laga limit hi koi thakeh. Apuni kan moike khosol kuribo dibole mun nai?

Mother : Avilie olop rukibi naa. Papa anidi aseh.

Father: (water flowing from tap) hunei aseh na avilie! Chuoo paani lobhi. Bitor lui jabi bathroom toeh.

Avilie: Thank you papa. Itia toh aaram para khosol kuribo.

Scene change: Instrumental effects/ kitchen effects

Father: Menenuo aji toh kom-chawal roti hoilibi bonabi na. Moibi raja chutney ekta bonai dibo toh.

Avilie: (laughing) itu toh biya nahoi toh. Honishe Uncle supong bhi ghor teh ahia aseh toh na aji?

Father: Hoi! Tai moike kaali call kurishe toh. Bahurishe apuni keh koboleh. Tai itia rasta teh hi ase aro joldi ahibo koishe.

Mother : Janeh papa laga kisa college days teh. Tai keh “Galho Khreibu” mati thakishe (laughing). Hostel teh tai Galho bonaikina sobke khelai thakishe. Last time bi uncle Supong papa para bona galho hi khabo koi thakishe.

Father: (laughing) sob manu bhi toh kitchen engineering teh expert nahoi toh na. Beshi dukh ase aro beshi experience lageh.

Avilie : Mummy...papa thik koishe. Moi bhi papa para bona khana khushi pai. Beshi hi meetha aseh(everybody laughs)

SFX: sound effects of car horn.

Mother: Car-i ahishe. Supong uncle hobo naki.

Scene change: change over music/doorbell/ door noise.

Father: Ahibi,ahibi!! Moi khan apuni keh rukhi thakishe.

Supong: Salem aro good morning. Apuni Kineka aseh?

Avilie: Good morning uncle.

Supong: Hello my young friend. Apuni karne special chocolates anidishhe heh.

Avilie: Thank you uncle. Apuni kitia bhi nabhawreh.

Mother : Good morning Supong! Beshi deri beshiteh hi ahia aseh toh ghor teh.

Supong: Good morning Dr. Menenuo! Moi olop busy thakishe ho. Trainings aro public awareness laga lectures karne alag alag jagah teh jai thakishe.

Avilie: Wow uncle! Apuni toh outing hi outing naki. Moi bhi khushi pai toh alag alag jagah saboleh aro Beraboleh. Uncle toh bhal kaam kuri aseh teh public awareness karne.

Mother: Avilie! Apuni toh water conservation karne training lageh(laughing).

Avilie: Mummy moi kitia bhi paani nafelai teh.

Father: Apuni naa itia para bhi komti paani para khosol kuribo pareh teh.

Avilie: Esshhh papa bhi na...roof top tanki teh paani bhorta thakile chui leh ki?

Supong: Avii! Ineka ideology thik nai. Eneka thinking para Water mismanagement hoi jai aruu itu toh biya aseh. Moi kan bhabeh aseh as humans moikan laga full right aseh paani toh kineka bhi istemaal kuribole. Hoilebhi itu galti aseh. Duniya teh Sob laga right aseh teh khali manu karne nahoi. Itu all living organisms karne aseh.

Avilie: Moi moikhan laga text books teh duniya teh two-thirds toh paani para cover kurina aseh kurina purishe. Eneka hoileh ki jinta?

Mother : Avilie apuni sob subject teh half knowledge hi aseh ho. Apuni koa bhi hosa aseh hoilebi janeh? Itu duniya teh majority paani toh saline aseh. Aro saline water toh khabo karne fit nahoi. Khaboleh karne paani toh beshi komti hi aseh. Duniya teh 97.8% laga paani toh oceans and seas teh aseh. Aro itu laga paani toh khaboleh napareh.

Supong: Thik koishe apuni laga mummy para. Duniya teh 2.7% paani hi pure aseh hoilebi itu 2.7% teh bhi majority toh polar region teh hi aseh.

Father: Moi khan hotai use karne toh paani beshi komti hi aseh. Ami kan kobo paribo ki paani toh most valuable natural resource. Itu kane moi khan beshi care para paani chobo lageh.

Avilie: Papa apuni bhi na ki philosopher nishena khota koi thakeh ho. Paani...aro itu bhi most valuable?...impossible (laughing)

Mother: Avii! Paani nathakeleh zinta thakibo naparehbo. Itu karne paani toh beshi valuable aseh. Paani jivan aseh.

Father : Moi khan laga human civilization paani logot hi link aseh. Duniya teh civilizations sob river banks nahoile nudi laga osor teh hi thakishe. Apuni text books teh bhi purih kena thakibo. Sindhu ghati, Nile aro Mesopotamian civilizations sob river banks teh hi flourish kurishe.

Mother: Paani hi moi khan laga source of civilization aseh. Ami khan laga folk songs, art & culture, literature, religion aro philosophy teh bhi paani laga mention kuri kenah aseh.

Supong: Health bhal karne paani laga purity, quality and sufficient quantity beshi important aseh. Ami khan laga body teh bhi paani toh ekta zaroori constituent aseh.

Mother: Bhaat nakhai nab hi moi khan olop teri zinta thakibo pareh. Hoilebhi paani nathakeh na ekdom naparibo.

Supong: Living organisms teh 70% body weight toh paani aseh. Body cell teh bhi maximum part of cell components toh paani aseh. Unicellular or multicellular animals teh bhi paani toh sob part of the body teh aseh.

Avilie: Matlab toh paani moi khan laga body weight teh “main” aseh?

Supong: Hoi. Moi khan laga body teh 60-70% toh paani aseh. Moikhan laga khoon, hardi laga cells aro tooth enamel teh maximum quantity of paani aseh. Paani para hi moi khan laga body teh chemical reactions laga kaam kurei.

Avilie: (with suprise) Chemical reactions!!?

Father: Ki eman asurit. Paani bhi toh chemical aseh toh. Tai laga chemical formula H₂O aseh.

Mother: H₂O matlab, paani twita (two) atoms Hydrogen aro ekta(one) atom oxygen laga molecule aseh.

Avilie: Eneka hoile paani bhi kunba chemical properties thakibo lageh.

Mother: Hoi! Eneka aseh. Avilie!! apuni paani laga character janeh?

Avilie: Achha, Pure form teh paani toh colourless, tasteless aro no smell(odourless). Eneka aseh koile ocean aro sea laga paani kileh eman nimok nimok nishena?

Supong: Itu paani laga taste nahoi. Itu toh sea teh thakia nimok karuneh aseh. Paani laga ekta good quality aseh ki paani logot kisum kisum milibo pareh. Paani teh all forms of salts dissolve kuribo pareh. Itu karne sea laga paani toh nimok nishena.

Mother: Paani laga itu character karne moi khan laga jivan teh paani beshi zaroori aseh.

Supong: Paani laga every single drop jivan karne zaroori aseh. Ami khan laga body toh ekta chotu city nishena aseh. Cities kan julibole efficient transport system lageh. Itu nishena paani para transport system laga role khileh. Paani para hi moi kan laga body teh essential nutrients cells aro tissues teh lui jai. Aro waste products bhi tai hi felai.

Father: Paani teh beshi minerals milai na aseh. Itu minerals para moi kan laga paani enrich kurei. Aro itu dissolved minerals jaga jaga esaab teh alaag alaag thakeh.

Avilie: Papa, itu karne hobo toh kileh paani laga taste alaag thakeh jaga jaga teh.

Supong: Hoi. Paani toh simple compound hi aseh. Hoilebhi tai laga physical aro chemical properties toh alaag aseh. Paani para hi sob organism thakiboleh teh. Paani para hi organic evolution teh zaroori role khileh.

Father: Hoi. Poila teh chemists kan paani keh important element aseh kurina mani thakishe. Henry Cavendish 1781 teh paani toh molecule ase aro element nahoi kurina prove kurishe.

Avilie: Oh! Itu toh scientists khan para bhi kurishe toh.

Supong: Hoi, Avi. Modern science laga baba aro France laga chemist Lavoijear 1783 teh tai laga experiments para paani toh hydrogen aro oxygen laga molecule kurina prove kuri dishe.

Mother: Paani toh structure teh simple hobo pareh. Hoilebi tai laga molecule toh beshi special aseh. Earth teh tai sob tinta(3) forms teh thakeh-liquid, solid aro gaseous form.

Avilie: Mumyyy! Ice.....ohh! moi ice cream khabole khushi pai. Mmmm eman meetha aro thanda... thanda.

Father: Sabi toh....sabi toh.... Avilie toh hotai ice cream nahoile chocolate hi mangeh. Tai toh eneh olop bhi chance paile ice cream hi mangeh.

All are Laughing#####

Avilie: Kileh paani eman special?

Supong: Kenii, paani toh special chemical compound aseh. Paani teh Hydrogen bond karne paani laga unique properties aro character bonai. Compound bitor teh Paani laga boiling point aro freezing point laga difference highest aseh.

Avilie: Paani lagah surface tension karne mochor khan (mosquitoes) tai laga opor teh buhibo bhi napareh aro swim bhi napareh. Paani laga surface tension teh stress karne liquid water teh choto animal aro insects kan nadubeh.

Mother: Stagnant water teh mochor khan beshi flourish kurei. Itu karne kerosene paani laga opor teh thaleh. Itu para paani laga surface tension kom kuri de aro kitia mochor khan buhei paani laga bitor teh khushi jai. Itu para mochor laga breeding rukhai.

Supong: Hoi, apuni laga mummy koa toh thik aseh. Paani laga sob tinta(3) form toh beshi jaruri aseh jiwani thakibole. Ami kan jane liquid paani laga jaruri hoilebi alaag twita(2)-gaseous aro ice(solid) bhi jaruri ase. Earth laga temperature tar twijun para motot kurei.

Avilie: Uncle.... Earth laga average temperature kiman aseh na?

Father: Earth laga average temperature toh 15 degree Celsius ase.

Supong: 1930 nahua tak Kun para bhi Hydrogen bond ki ase nijani kina thakishe.1920 teh D.H. Lawrence Hydrogen bond laga janai dishe. Hydrogen bond toh tagot teh toh komjor aseh. Itu hydrogen bond

aseh kuntu para paani keh tar lagah unique physical aro chemical properties deh.

Avilie: Hellooo....hello...gentleman (laughing) hoishe ...hoishe...eman hi kuribi itu laga discussion. Break lageh aseh. Uncle Supong tar laga oral presentation karne aro tagot lageh.

All are laughing#####

Avilie: Mummy itia apuni laga turn aseh apuni laga expertise dhikabole (laughing)...apuni laga special cha nahoilebi coffee bonaidibi na? Aro khabole bhi kiba.....

Father: Mummy toh chukha teh busy..... Supong apuni ki koi thakishe?

Avilie : Uncle, Avilie toh question hutei bole joldi hoilebi studies teh toh beshi careless aseh.

Supong: Kenii...eneka nahoi...sob ideas karne dimaag lageh(laughing). Aji janishe Avilie toh super genius ase.

Avilie: Wow! Thank you uncle...apuni buje ase....moilaga buddu didi(laughing)

Father: Avii...uncle Supong bhi toh genius aseh. Tai baccha khan logot bhi ekta nishena milibo pareh.

Supong: Hoi, moi jane apuni class teh top 10 rank teh pai. Moi thik koishe na? Paani flow bhi kuribo pareh, freeze bhi aro vaoprize itu nisheana apuni bhi situation alaag alaag teh alaag alaag behave kuribo pareh . (laughing)

Father: Hydrogen bond nathakheleh paani grease nishena hobo toh.

Avilie: Eneka hoile...ami khan bhi ki hoi jabo?

#####Sound effects of kitchen/cup/plates#####

Mother: Hoishe...Hoishe.....coffee anidishe.....aro special snacks karne aro olop time lobo.

Kenii: Thank you mummy...apuni hi sobse bhal.

Father: Sabhi toh...Avilie toh tar laga amma ke eman phuslai aseh.

Avilie: Uncle itu phuslai nahoi teh. Water bond natakheleh paani itia form teh nathakibo, eneka hi mummy nathakeleh cha aro snacks nathakibo(laughing).

Mother: Duniya teh Paani nathakileh jivan nathakibo.

Father: Esor morom para eneka nahoi. Duniya teh paani para hi jivan de.

Supong: Apuni asurit hobo ki paani hi sob jivan deh.

Avilie: Temperature kitia freezing point ke nije ghiribo megh laga water vapours condense hoi aro snow ghireh. Itu para itu ke bhi freezing temperature of water koi.

Supong: Ice hoilebi snow laga shape hexagonal thakeh. Itu form teh hydrogen bond laga molecules para paani laga molecules ke dhuri ma rakhe. Snow laga density paani keh komti aseh. Itu karune hi ice/snow paani laga opor float kuribo pareh. 4 degree Celcius teh paani laga desity 1 gram/per centimetre aseh.

Father: Temperature uthia isap surface bhi expand hoi aro density nije ghireh. 0 degree Celcius teh ice aro paani laga density alaag alaag thakeh. Itu temperature teh ice paani keh 9% para beshi jaka loi. Itu karne aseh duniya laga snow surface one-tenth paani laga opor thakeh.

Avilie: Matlab toh moi khan ki dekeh sob hosa toh nahoi na

Mother: Avilie...apuni thik aseh. Moi khan ki dekeh sob viswas nakuribo lageh. Itu illusion bhi hobo pareh.

Supong: Hoilibi pressure uthia esap, ice laga density ghireh. Ice laga lower surface teh more pressure aro stress thakeh. High pressure karune snow toh freesing point ke bishe nije teh bhi melt kureh. Paani nishena hi snow bhi flow kureh. Maas (fish) aro alaag living organisms snow surface laga nije teh zinta thakibo pareh.

Avilie: Moi snow beshi khushi pai. Avilie yaad aseh Jammu and Kashmir teh Gulmarg teh trip jaa toh.

Father : Snow fall ecosystem laga conservation aro maintainance karne ekta jaruri role khileh.

Supong: Snow laga slippery surface baccha khan aro sportsmen kan khushi pai. Itu characteristic karune skating aro skiing khilibo pareh.

Father: Nau(boats) paani laga opor float kureh, manu paani teh swim kuribo pareh. Eneh alaag hi experience aseh nudi aro tar laga ecosystems laga mutzaa toh.

Avilie: Papa, nudi laga kinari teh picnic jabo ahibi na. Uncle Supong bhi ahibo pareh. Beshi mutzaa hobo toh.

Supong: Oku nahoi toh. Bhaal hobo toh nudi laga kinari teh picnic(laughing).

Mother: Accha...sob tayaar na...hoi na nahoi

#####in one voice#####

HOI....TAYAAR ASEH. NUDI TEH PICNIC JOBO AHIBI AJI!!

Scene change

#####noise of door opening/car start/horn/traffic on road side#####

Supong: Wow! Development beshi hoishe toh.

Mother: Supong, sabhi toh uthateh. Nudi kinaar beautification project aseh. Government itu project the crores hi crores karsh kuribole aseh.

Supong: Development toh bhal aseh hoilebi water harvesting laga natural process teh beshi disturbance teh.

Avilie: Moi pyaas lagi aseh.

Father: Itu nudi laga paani toh nakhabi...beshi letera aseh....colour bhi sabhi toh...

Mother: Packaged mineral water bukhina aseh moi...laaa Avilie khabi.

Avilie: Paani toh eneh misa meshi jineez nahoi ho na?. Bhagwaan bhi asurit lagii na thakibho taar bonaa teh. Paani teh sob milawat kuribo pareh, nimbu ekela nahoi holebhi aam aro alaag fruit pulps, cheeni aro kisum kisum bhi...hahaha... Taar toh universal in acceptance teh.

Mother: Ami kan manu kan bhi eneka hobo lageh. Alaag manu dukh pai dam teh modot kuribo lageh.

Supong: Hoi, Dr. Menenuo..hahaha...moi kan bhi paani nishena hobo lageh. Itu karne hi paani keh universal acceptor koi toh. Paani teh carbonic aro non-carbonic compound bhi milaa bo pareh. Paani laga special ionic character aseh. Paani toh ionic compounds karne ekta miracle aseh.

Avilie: Uncle apuni moilaga saathi Merang ke lok paile paani nishena aseh kobo...hahahaha...toi sob logot ek baar teh hi saathi bonabo pareh .

Mother: Paani laga etu character karne amim kan laga khoon para nutrients sob jaga teh lui jai loi. Ami kan laga body teh paani hi hydrolysis laga sobse zaroori source aseh. Hydrolysis time teh carbohydrates, proteins, fats etc sub-particles teh break up hoi ase aro paani para hi etu sob loi jai body cells thak.

Supong: Aro ekta khota aseh ki paani eneka solvent bhal hua para impurities kan bhi mili jai. Etu karne ami kan dikhe rivers aro lakes laga paani teh beshi impurities dhikeh. Etu karne rivers aro lakes laga paani directly khabo leh thik nai.

Avilie: Moi kan bhi purify kurina hi khabo lageh. Boil kuria para paani ouriy kureh.

Supong: Hoi, eneh living organism khali karne nahoi hoilebhi paani toh planet karne bhi beshi zaroori aseh. Paani ekta stage para alaag stage hoi time teh enegy beshi khai teh. Ek gram ice para paani hoi jai time teh 80 calories energy khai teh. Aro paani para water vapour convert kuria time teh 530 calories khai teh.

Avilie: Kileh eman heat lageh paani boil kuribo karne?

Supong: Paani laga specific heat toh beshi aseh aro paani boil hoboleh energy beshi jolailoi.

Avilie: Specific heat toh ki aseh?

Supong: Etu kiman heat lageh paani keh ek degree celcius para paani laga temperature keh othabole. Ek gram Paani groom hobole karne kineka ekta calorie lageh eman para loha(iron) toh tos (ten) baar groom kuribo pareh. Etu karneh hi paani industries aro factories teh cooling karneh istamaal kureh.

Mother: Hoi toh etu para paani living organisms karuneh paani beshi zaroori aseh. Hosa bhi aseh paani hi jibon aseh. Aro ekta khota....kimaan paani beman moikan laga future bhi bhal..

Supong: Bhaal para koishe Dr. Menenuo. Moi kan mon teh rakhibo lageh ki paani para moikan laga future surakshit rakhibo.

Avilie: Uncle Supong...Uncle moi etu mon teh rakhibo. “ Save water...means...Save our future”.

Kenii: Bhal hobo moikan kosom khaileh ki moi kan paani ekta drop bhi nafelabo. Paani jivan aseh.

Title song/signature tune#####

Closing announcement>>>>>>>>>>

Science Quiz:-

Question 1. Duniya teh kimaan percent paani oceans aro seas teh aseh?

Answer : 97.8%

Question 2. Paani (water) moleclules toh Hydrogen aro Oxygen atoms para bonaishe. Hosa aseh?

Answer: Hosa aseh. Paani(Water) molecule toh H₂O koi aro etu hydrogen laga twita(two) atoms aro Oxygen laga ekta(one) atom para bona aseh.