

ROOT & STEM

Grade Midaaswi Computer kinoomaagewin

NAKE MNO-BIMAADZIWIN

Gezhi mno-chingeng
Kinoomaage Aachkinganing

GAAZHI CHIGENG

Ezhnang ow gaazhitood chibaa
aadsemgak

**NAKE GE ZICHGENG GI
MOWDOSHKAJIG**

Gezhi wenpan maajtaang



WIIDOKAAZWINAN

KINOOMAAGZIWNAN

WIIDOOKAAZGIG

AABJICHGAADEMGAK

JICHGAADEG



NOOKIITOWGEW-GAMIK

AMPERE BIMAADZIWIN

Ampere wdi maadaadoon iw bimaadziwin ji wiidookwaad kinoomaagzigin omaa STEAM kinoomaagewgamig. Ndi gotaamgozmin gii miigweyaan aabjichgaajganan ge ji wiijsengowaad giw e kinoomaagziwad.

Giishpin wiii kendmaan washme, bizhaan omaa iw website

amp.ca



ROOT & STEM

AMPHERE E AAWID

Gaawin gegoon wdi yaaziinaawaa giw kinaa edbendaazijig, wdi dagoonaanaawaa iw STEAM ji mno kendaaswaad megwaa mno wiindmaagewaad, mno yaawaad, mno maajigwaad omaa endaaawaad. Wegwenshidoog ge bi iidoog enjibaawaad Ampere wdi wiidookwaawaan.

DIGITAL MOWNDOKAAJIGANAN

Gaawin eta coding owzi noon iw Computer Science Education. Kina e kendjaadeg nake ge e chigeng ge nake ezhi wiingezwyin pii kina aabjichgaadeg niw e maadanmon. Dowaabdon niw icons niisi'ing etaamgak .



NAKE EZHITCHGENG

- Ge maadaadooyin ji wezhtooyin
- Noojgegoon e shkonmon temgak
- Mkendaagwad ge e Nendmaagewad
- Niiwa gechigeng
- Pagdoon Enizhisnook



COMPUTING AND NETWORKS

- Emshkawaag ge Enokaag Aabjichganon
- Egiyak zagaknigaadeg
- Dowaabdong waa Nizhisnok
- Digital Connectivity
- Cyber Tkonwewnini



GEGOON EZHKONMON

- Gegoon Ezhkonmon ge nake ezhi Aabjitooyin
- Gyaksidooyin Gegoon Ezhkonmon
- Mowndooniyin Ekendmon
- Edabendaagwak ge Niiigaanzid
- AI ge Kinoomaagewin Abjigichgan



TECHNOLOGY AND SOCIETY

- Enishing Giigdowin
- Ezhi dawenjgaadeg, nishing, dbaaknigaadeg
- Tech minwaa kina aki
- Gaa zhiwebak ge Technology
- Tech ge mno yaang



EZHITOOD

- Aabjitoon Ezhittod
- Ewaabdong Ezhitood
- Kina Ezhitood

Powered by Root & STEM zhibbiigaademgad Forest Stewardship mziniganing, ji shkonmaageyaang iw aki.

Giw Government of Ontario ge Government of Canada gaa miigwewaad zhoonyaa ji wzhitchgaademgak iw mzinigan.

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Gaa Wiidokaaswaad

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Chantal Jung

Ntam e gnoowaabdamon mzinigan

Nunatsiavut Inuk owi gii kinoomaadzo gi zhiibiiged ge gi bzinbiiged. Happy Valley-Goose Bay Newfoundland (Nunatsiavut) bi jibaa noogo dash Ramaytush ohlone land (San Francisco) ndaa. Wgii nookitwaan Black Belt Eagle minwaa Bartow Project minwaa teni Inuit Art Foundation odi *Inuit Art Quarterly* gaa bzinbiiyang.



Jon Corbett

Ezhibiiged: Waashme e nishing omaa Anishnaabe enendang • 6 mzinigan

Kinoomaagan ge wiin owi ow Jon Corbett gchinendaazi odii School of Interactive Art & Technology odii Simon Fraser University. Wdi taawtoon wiindamaaged ezhi mno bimaadgid Aanishnaabe ge wdi taawtoon gi aadosked ge gi wiidookaazod aabjitoong iw computer.



Austin Cozicar

Gaazhi Chigeng • 7 mzinigan

Eaansoked Gimaa aawi ow Austin Cozicar wdi nookitwaan Neil Squire Society odii Lower Mainland Region British Columbia. Midaaswi mni odii nokii taage zhibiiged ge aansoked. Austin kido ndi gchi nendam kendmaan gi wiidaamaageyan minwaa gidaaswinan kendmaan.



Brian McLachlan

Mkawe Digital • 10 mzinigan
Pane Winisemgad • 12 mzinigan

Brian McLachlan gaa bzinbiiged iw *Complete the Quest: The Poisonous Library*, minwaa edzhiikmon ge e gidmon kina ge ndaa shkittoon ji bzinbiiyang mzinigan. Minwaa ge kinoomaage odi Youtube Deep Thought Balloon ezhnikaadeg.



Sharon Aschaiek

Nake Mno-Bimaadziwin • 13 mzinigan

Gchi Gimaa owi ow Sharon Aschaiek odii Higher Ed Communications Wdi zhibii'aan mnik e temgak chibaa mooshkneg, wdi zhitton ge nake ge zhi wiidookaagyin gi mshkowziyin, minwaa gi shkitootyin ge nake ge wiidookaazyin.



Tanner Big Canoe

Ebgbaakigaadeg Computer Science E chigeng • 14 mzinigan

Tanner Big Canoe owi Computer Science graduate odi Queen's University gii kinoomaagzi. Niigaanzi odi Ampere minwaa pane wdi dowaabdon iw software ji wiidookaagod e kendzic nake ji wezhtood.

Waashme e nishing omaa Anishnaabe enendang

E bzinbiibeg ge kinoomaagan ndow, ndi niizho nehivaw (Plains Cree) toonan A nishnaabe bimaadziwin ge technology. Anishnaabe kidwinan ge bimaadziwin ndi aabjitoonan ji wiidookaazyang oma aki. Ji maajiishkaayang ndi aabjioon iw entowchigeyaan aabjitooyan iw ekendmaan ji kendmowaad gi Gchi Gimaa'ag odi Ontario Grade 10 computer Science kinoomaadwinan. Kina ndi wiidokwaag, giw e gnoondbewaad ge give a wiidookaaswaad ge gi e gtaamgozwaad ji skitoowaad ge wiin waa.

Aabjitooyan noojgegoon g'gaa mnendaamin kinoomaagziyan ge nga mnendaagzimin. Shpendaagwad Ontario government wiidookaazwaad ge wiinwaa gchi wiidookaazwong ji mowdoo mnendmong kinoomaazyang ge wiidookwiyaan ji kendmong iw mno bimaadziwin ge nake gezhi aabjitooyang kina e kendmong.

Mnendaagwad kendmon chi shkitooyin ge ji mno dowabdamon ge nake ge zhong. Washme da mno bimaaziwag giw ekinoomowdwaa gii miindwaa iw kendaaswin, ge nojiwiya ezhi bimaadzid, mi iw ge wiidokaagyong ji mno de'e yong ge ji mno bimaadziyong. Grade 10 Computer kinoomaagnon g'ga wiidookaagnon nake mno bimaadziwin.

GE ZHI MNO BIMAADZIYIN NAKE

Da kenjgaade gaawiin daapshko yaasiwag giw Epingishmok ge Anishnaabeg. Gchi nendaagwad aki ge nake ezhi ninjichaagminaan mi iw e maadaadooyang minwaa emnendmong. Wiinwaa giw Epingishmok wdi shpendaanaawaa iw niigaanziwon ge e mchog ge e wewiibtaamgak. Giw Anishnaabeg wdi aabjitoonaawaa iw gidaawinan ge wewenaa gnawenjaadeg miidash washme ezhi kendang echigeng ow ekinoomaagzid.



MSHKIKI NAA AMPERE

NAKE EZHI WIIDOOKAAZWAAD ENDAAJIG

Washme da mnobdegad kinoomaagewin giishpin wiidookaazwaad endaa jig. Kinoomaagnag wiidookwaawag nake ge ji kinoomaagewad minwaa nake ezhi aabjitoowad. Getziyag ge giw ekendaaswaad minwaa giw eniigaanzijig da wiidokaazwag. Kina chigewaad kinoomaagzilig wda kendaanaawaa mno bimaadziwin.

CULTURALLY RESPONSIVE PEDAGOGY

Kinoomaagnag aabjitoowad iw Pedagogy ji kinoomaagewad ge zhi gchi gotaamgwendaazyin. Aabjitooyin gidaawinan minwaa nake ezhi weshtooyin ge nake ezhi nookiimgak giw kinoomaagzigig washme nda kendaaswag. Aabjitooyin nake ezhi giigdooyin washme g'ga msendaan Anishnaabe owoyin minwaa g'ga kendaan dbendaagziyin.

Pane aabjitooyin iw Anishnaabe bimaadziwin ge giidowin washme giw kinoomaagnag da kendaanaawaa ezh spendaagwak iw bimaadiwin. Wdi kendaamaawaa ge giw ekinoomaagzigig nake ji mno bimaadziwad. Kina go ekinoomaagzigig wda mendaanaawaa nake ge ji wiikookaagewad ge nake ge zhi gnawendmowaad aki.

— JON CORBETT





◀ A Makers Making Change nookiitaagan wda wiidookwaan niizh ezhkiniijig ji wzhitowaad aabjichganan

Gaazhi Chigeng

E zhitoojig ge wiidokwindwaa e niipnizwaad

AUSTIN COZICAR GAA ZHIBIIGED

Wdaa wiidookaagnon e niipnizid gi mno bmaadzid ge gi wiidookdaazod. Mkwenim giw e giibiigwewaad, giw e bmosesiiwaad wiidookwik gi maajiiwaad. Emchaag zagagookgan gi mkong gi wenpanak dziikang ow e niipnizid.

Geget sago naa zaam shpongdemgad niw technologies. Ngodwaak naagdem gad iw emchaag zagagookgan. Znagad gi yaamon niw aabjichganan.

Makers Making Change (MMC) Ezhoonyaa gesik Canadian Neil Squire Society wdi zhittonan aabjichganan aazhi dbe'ing. Gdaa shkitoomin ji wzitooyang noojgegoon ge aabjitoopan noojwiyaada kinwaabjigaademgad 3D MMC nookiitaagnag wdi zhito naawaa washme ji wenpangideg. Bknaakoode ezhinaagwak tooyin giiji zhibiigaasing gaawiin da zinag sinoon zhibiigeng, eniipnijiid gdaa shkiton ji zhibiiged ge giw waa dajiikmowaad iw joystick miigiw e shkitooisic ji aabjitoowaad wninjiin.

Iw dash STEM Chigeng aabjichgaadeg, MCC wdi domaawaan Canada kinoomagzijig ji bi zhaawaad, MCC wdi zhittnaawaa noojgegon niindiwe wag odi kinoomaagew aachkingan ji wiidookaagemgak. Giw ekinoomaagzijig wdi kendasanaawaa ezhi znagzid ow e niipnizid.

MCC's East Region Coordinator Courtney Cameron ekidood "Gaawiin na naangodnong giw ekinoomaagzijig wdi mkwendzii naawaa ezhi znaagak iw tech giispin niipnizyin."

Nooji saabongzigi ge bizhaapan niw workshops. Kinoomaaganag wdaa kendaanaawaa ge nookiimgak odi Kinoomaagew aachkingan. Kinoomaagan wdaa shkitoon ji kinoomaaged maage da MCC nookiiganag da bi wiidookaagoon. Minendaanaawaa ekinoomaagzijig .

Cameron kido "Mnendaaziwag giw ekinoomaagzijig minwaa mnendaanaawaa waabdomwaad gaa chigewaad ge giw naangodnong e dewendzik chi kinoonmaagozid."

Pii ntaam maajtang kina go iw ekinoomaagzijig wdi waabdaanaawaa echigeng miidash ji shkitoonawaa gi aabjitoowaad endaawaad maagego kinoomaagew gamgong. Gdi kinoomaagos ge ji aabjitooyin iw CAD software.

Nooj zhinkaadeg e aabjitchgaadeg kinoomaagew gamgong TinkerCAD minwaa Autodesk Fusion 360 miigo ji skitoowaad ji wiidookaazwad

Wzhige zhitooing emyaa mnendaagwak. Mii imaa zhitchgaademgak noojgegoon miidaash miigwewaad odii aakziiwew-gamgong ge giw e niipzijiig.

Niw circuits ge electronics ge microcontroller workshops nii iw nake ezhi aabjitoowaad giw ekinoomaagzijig. Naanind wdi gwetchtoonaawaa nake ezh mnobdeg kina niw aabjichganan.

Pii ni shkaatangak iw workshop kina mowndoshkaawag ji kenmowaad ezhi znagad iw niipnzong.

"Pii kinoomaageyin nake gezhi wzitood ezhi gtaamgozid aabjitood niw ninjiin" kido Cameron." Kina wdaa zhegiwewdoonan niw aabjichganan ji wiidookaagemgak odi endaawaad. &



COMPUTING AND NETWORKS



EZHITOOD



TECHNOLOGY AND SOCIETY

Minwaa wii kendmon ge goon odii Makers Making Change's STEM with PURPOSE workshops, giw ge STEM Workshop Planner, mi imaa ji mkamon makersmakingchange.com/s/stem maagego ndaa maajibiimaawaag odi info@makersmakingchange.com.



Nake ge Zichgeng gi Mowdoshkaajig

ZHIBIIGED WII AMPERE



MSHKIKIWAG NAA AMPERE

Pooch gdi mowdo wiidookgaadmin ge gdi aa aptomaadmin enendmong ji mnobideg echigeng. Iw yak technology ge inovations,wdi wiidokaagnon gi mnobideg echigeyong: mowdoshkaajig.

Kinaa giw ezhittowad ge giw emsinbiigewad, ge giw e kendaagzigig mowdoosh kaawag gi weshtowaad emnobdesnok.Gabegiizhik maagego niizh giizhgad dnikaamgad ji mnobideg echigeng bekizh ge gdi mnowaaz.

Noojigeoon yaamgad iw mowdoshkaajig, medical tech, mobile apps, APIs, ge niibwaa aabjitoonaawaa. Gda wiidookaagon gi mnobdeg minwaa e aabjitooyin. Mowdoshkaajig mowndooshkaawag gi pane wiidookaazwad ge pane ji bizindmowaad kina e kidwaad noojwiya ge kin ji kendmowaad eshigeng ji mno bdeg minwaa ji kendaagziyang.

Gdaa mnendaan na chi bi jaamgak iw mowndoshkaajig odi endaayeg? Mi iw ge maadanmon.

DOWAABDON BI'IIDOG YAAMGAK JI ZHANG

Dbe'ing dnikaamgad ji mkamon ge zhaang ji mowndowshkang. Wewiib maajtaayin ji dowaabdamon gnaama wiya gdaa miinig ji mowndowshkang. Ge gwedweyin pii gnoonad wiyaa:

1. Gtaam gwiinad na ge aabjitoowaad computers ge devices?

2. Wewiib taamgad na wi-fi ji aabjitoowaad niibwaa?

3. Mchaam gaad naa aachkingan gi nookiiwaab niibwaa maage goo wiinwaa eta wii nookiiwaad?

KENDAAGAK GII BI DGOOSHININ

Eventbrite, aabjichgaade gi kendaagwak wii bi zhaayin. Gdi wiindmaage wewiib ji kenjgaadeg ezhwebak. Zhnikaazwinan ge gwedweyin minwaa gwedwen ge goon ge miijsiwan, maage gwedwen waaji dawendang ji bi naanind, minwaa gwedwen gi aabjitooyin mzinaazgan, minwaa eshi dawendang ji gnoonind pii minwaa nk weshdaading.

EZHI GTAAMGOSING

Gda wiindmaagon ge gda wiidookaagon ge chigeng ge mnik ge ge mowndooshkaawad. Noojwiya g'gaa saa ji mowndooshkaawad giw ge e mshkowsii waad ge giw a nataa niigaanziwad—mii dash ji mnobdemgak. Gwejim kina oondi myaa ntawtoonyin. Ge chigeng nake:

Gdi ntowtoon naa aabjitooyin coding and technology?

1. Ndi shkitoon gi mooshknaadooyan iw Evenbrite, mii eta iw
2. Ndi shitoon gi aabjitooyaan iw computer gaawiin dash coding ndi aabjitoosin
3. Bangii eta ndi aabjitoon iw coding maadonnaan iw

kinoomaadwin Hour of Code maage Scratch

4. Ndi towtoon ge ndi kendaan nake iw code minwaa aazhi ngii zhitton noojgeoon
5. Code pane ndaabjitoon

NDAWENJGAADEG

Da kenjgaade e dawenjaadeg ji shwaataawaad gaa zhitoowaad kina. Kina da biidoonaawaa laptops, computers minwaa emshkow-siizwong internet. Giishpin wii gwechkinwaadwaa giw gaa bizhaajig pooch go wda kendaanaawaa iw coding kidwinan ge aabjichganana. Pane wiidookow giw e niigaanzijig giishpin mnedmowaad.

GE GWEDWEYIN CHI MNSHOWZIIWAAD KINA:

- Waagnen e yaamon gi mshowziyin ge emendmon?
- Waagnen waa chigeyin gi wiidookaazyin?
- Gdadwendaan na giin eta ji nookiiyin maagego wiyaa gwii wii nookiimaa?
- Kinaa na gdadwendaan gi kenmond maagego ge goon eta gdadwendaan?

Binoojii'ag pkaan chigewag shwiin giw eshkiniigjig. Gaawiin memkaaj wdaa aabjittonaawaa iw (Alexa). Washme dbe'ing dnak-migziwag binoojii'ag shwiin eshkiniigjig. Ezhnaksinook gwejim giw binoojii'ag:

- G'gii mnowaaz na?
- Waagnen gaa kinoomaagyin?
- Waagnen aazhi e kendmon?
- Gdaa mendaan na noojge goon ji kendmon maagego washme ji kendmon azhi e shkitooyin?

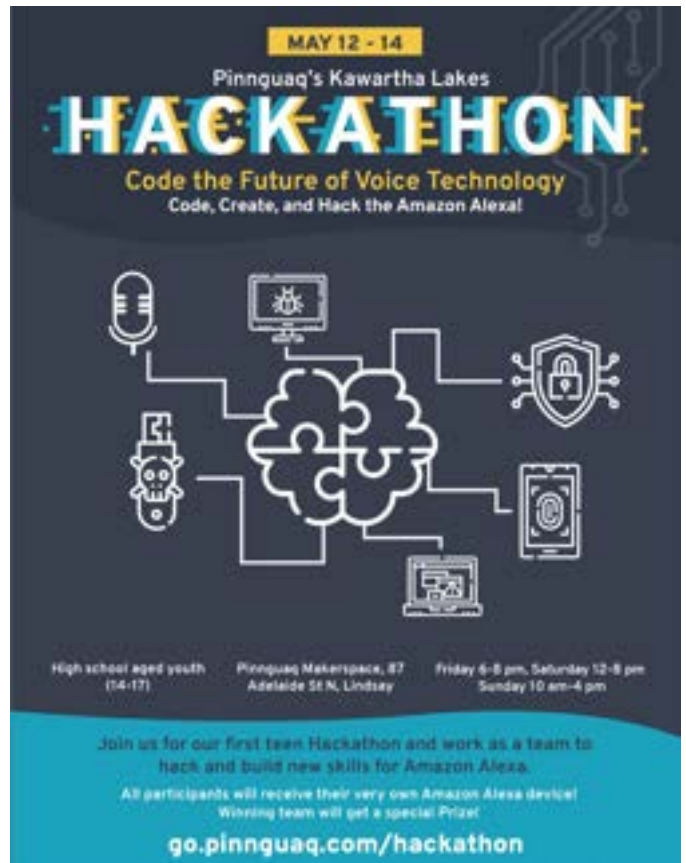
WAA CHIGEYIN

Niizh yaamgadoon ge mkwendmon pii miingoyin ge chigeng omaa maawndoshkaajig. Kina daa miin'aag naasaab maagego washme e zinaagak gdaa miin'aag. Ampere (Pinnuaq) mowndoshkaajig, kina gii miin'aawag naasaab Alexa Echo dot minwaa MIT App Inventor ji aabjitoowaad ji wzhittoowaad ge wiinwaa app.

Wiindamow kina gaawiin memkaaj dajiishtoosiin gaawiin ge memkaaj daa noojkiimgasnoon pii shkwaataayin iw mowndoskaajig. Debnaakgo mnendmowaad gaa chigewaad .

WZHITTON EDNAKIING

Pii gii shkwaataayin mii iw pii gi zhitooyin nake ge ji aabjichgaadeg. Ntam kinoomow kina nake ezhi aabjitooyin iw tech. Ga wiidookaagon mnik ekendmon. Pii Ampere mowndoskaajig kina gii wiindmawaawag nake kina e aabjichgaadeg, nake ge zhi wesidooyin mina gi aab jitoowaad Alexa devises,ge MIT App Inventor. Giispin we zhittyin ga dajiikmon g'gaa wiidookaagon naanind nake gaa zhitoowad ge coding aabjichganana .



Pii wii nookimad ow binoojii pooch gdi nanmaa ji dajiiked ge ji kendmaad niw e yaanind omaa aachkinganing. Miigo ji maani gnoondiwaad ge ji maaji wiidookdaadwad e chi ge waad. Maanoo da gnoondidwag baamaa pii gdaa wiindamowaag ge aabjitoowaad ge booniikmowaad. Mii iw pii ge kendmowaad waa zhitoowaad.

Maano da maaajtaawag pii gii shkwa gnoodiwaad ge pii kendmowaad waa chige waad. Maanoo da gtaamgwiini ge wiidookaazod. Pii ni shkwaakmigak maanoo da kendaanaawaa kina gaa chigewaad ge gi waabdyewewaad gaa zhitoowad. Ga miigwech mi'aag kina gaa bizhaawad ge giw gaa wiidookaaswad minwaa mi iw pii ge miindwaa ge goon gaa pinaagewaad.

WIINDAMAAGEWIN GE WIIDOOKAASWIN GIW ENDAAJIG Social Media

Gotaamgwiino e yaad oma social media ge waabdong gaa chigeng. Pane wiindmaagen pii minwaa wii zhiwebak aabjitoon iw hashtag ge wiidok ow gi dewendang echigeng. Wzhitoon maagego wiindamaagen ezhi mno bdeg iw mowndoshkaajig .

Kenjgaade

Nooj gegoon aabjittan ji wiindamaageyin ezhi mnobdegak e waabdamon. Wiindamaagen ezhi mnendaagwak iw mowndoshkaajig. Nooji wiya biijbiimow ge wiindmow giw aazhi goding gaa bi zhaawaad minwaa giw gaa wiidookaazwad.

Dawendaagwad gi mno waazing ge nooji gegoon ji kinoomaagooyin ge ji aabjitooyin ge ji mkendawaan gaa ziwebziyin. &



TECHNOLOGY AND SOCIETY



COMPUTING AND NETWORKS



MKAWE DIGITAL



Wiindamowshinaang gaa waabdamon gaa zhibiimaang.kinaa go e waabdamon, nda kendaamin yaayin. Noojogi gdi mkawe, miigo kenjaadeg odi gaa zhaayin. Da kenjigaadeg emnendmon. Gaawiin kenjigaadesnoon e waabdong ge gaa kenjigaadeg.

Gdi nendam na gaazhi mkawe yin?
 Debwemgad na maagaa go gdi giwnim?

Gdaa waabdaan nojiwiya e zhi mkawed.



Debwemgad. Kenjigaade Nijikwenhag ge gaa zhibiimon maago gaa gidmon. Dewenzii yin wiya j j waabdong. Niin eta ngaa waabdon.

Kendaasod daabaan wdi shkitoosin gi miigwed ge goon.



Giw nimo. Kendaasod daabaan wdi shkitton kina gi daapnong e chigeng, goopii gaazhaayin ge e piichbizysin. Giw gaa zhittowaad niw daabaanon wdi shkitonaawaa kinaa gi waabdaamwaad gaa miigwewaad.

Gdaa takoongo giishpin miigweyin maagego mowdoonman gaa mkamon



Debwemgad (kidwaag). Dabi'iidoog omaa kiing yaamgad ge wiidookaagyin wiya gi kendzik e owyin. Gchi toknaawag giw echigewaad. Geyaaba chigewag.

Mowdoo emnendaamon wiidookaagoon gi nsitmaan minwaa gi zhaang nake emnedamong.



Debwemgad. Minwaa washme gi kendmon eshki'i iin wong ge gi jitoonyin.

Giishpin zheyaaknamon giidoo biiwaadkoons g'gaa mkaan gaa wnitooyin maagego gaa gamoodmaagooyin.



Debwemgad. Aabjitooyin iw Google miigo ji mkamon gaa wnitooyin. Giishpin pane zheyaaksing miigo pane ji mkowgoyin. Giin eta maago e debwe'enmad gdaa miinaa edaawendmon ji kendaagwad.

Giishpin gaazing maagaago giin eta waasejgan gdaa makawig.



Giw nimo. Naanind giwnimwag aabjittoyin edbendziwon. Aaniwgo kidwaad gaawin gegoon gdaa zhiwebzisi. Naanind debwewaag kina go pagjigaade Giw e dbendmowaad iw internet service geyaabaa daa kenjigaade e chigeng,aabjittong iw IP address.

Giw e mowndo daapnomwaad niw e aabjichgaadeg pane wdi aabjitoonaawaa cookies.



Debwemgad. Cookies (gaawin bkwejgaasag) wdi mkwendaan ezhi zheyaaknamon iw websit minwaa pii ngadmon kina go wid kendaan ow cookie, odii California pooch gdi gwedwe ji aabjitoon yin.

Em shkowaamgak kidwin pane aabjitoon ji zheyaaknamon iw taabjichgan.



Giw nimo. Gdi bi gnoonig ow hacker mi dash nendmong kenmad gwemig gi miinand nake gezhi zheyaaknamond aabjichgan maagego da gwe giibaazmigoo.

ZHIBIIGED WII BRIAN MCLACHLAN



Nake mno- Bimaadziwin

STEAM mdewenoosan gwechkinaadwin di
wiidokaagon Anishnaabe gidaaswinan

ZHIBIIGED WII SHARON ASCHAIK



MSHKIKI NAA TAKING ITGLOBAL

▲ Msksdowzii giidowag Nodin Outten-Joseph ge Lucia Alnmeida gnoonaawaad the Honourable Marilou McPhedran megwaa gii zhaawaad odi Senate of Canada

*“Gii Gweki aatwewag gaawiin ngii maajaasiimin/
Gii kidwag niinwind enaamgeyaang gaawiin
ngii maajaasiimin”*

Nodin Outten-Joseph wgii zhitoon ngamwin. Anishnaabe owi ge aapta Mkadewnini owi, wiindamaage ezhi shpendaagwad saa iw Anishnaabemowing ge ezhi kataamgwandaagwod ji kendmon e aawid ow gdanwendaagon.

Iw ngamwin gii pinaagemgad 2022-23 Your Voice is Power, kina ekinoomaagzigig omaa Canada e jitoowaad ngamwinan, ge computer science miwaa Anishnaabe affairs. Amazon e niigaanbidoon iw gwetchginaadwin,

wdi wiidookaagnaawon kina giw e kinoomaagzigig ji kendmowaad iw science, technology, engineering, minwaa math (STEM) aabjitoong iw coding software bekizh ge mdeweganan gaa zhitoodwaad Anishnaabeg megwaa kinoomodwindawaa ezhi gtaamgoziwaad mewzha Anishnaabeg omaa Canada.

Aabjichigaade mdeweganan ji gwechood iw coding kido ow gaa maajood ge eniigaanzid Michael Furdyk ezhinkaazod odii TakingITGlobal, mii giw e gnawendmowaad iw gwetchginaadwin 2023-24. Gtaamgoziimgad geji kinoomaagemgak ezhi niigaanbizod ow Anishnaabe.

Furdyk kido Your Voice Is Power gii mkaajgaade pi gaa yaasnok bekaanziwin odi STEM fields, geyaaba wenmaawog kina. Aabjichigaademak niw technologys minwaa zhitchgaadeg ge wiidookmindwaa giw ezhkiniigig.

Odi Gchi Mokmaankiig nake gwetchkinaadwin gaa wiidookaagnaawaa giw Canadian ekinoomaagzigig

Wgii maajtoon iw gwetchkinaadwin 2022 Amazon Music and Amazon Future Engineer gaa wiidookaazod,ji wiidookmindwaa giw ekinoomaagzigig odii endaawaad.

Giw e daapnaomwaad iw Your Voice Is Power da kendaanaawaa nake ji aabjitooyin iw EarSketch,gaawiin memkaaj gdi dabyziin gi aabjitooyin wii kinwaabjitooyin ge ji wezhtooniyin ge ji bizindmon gaa zhitooyin. Ekinoomaagzigig wdi aabjitoonaawaa gi zhit-

towaad ngamwinan ge ji aabjitoowaa. Naanind Anishnaabeg gaa zhitoowaad.

Aysanabee, Dakota Bear, Jayli Wolf, Samian an Twin Flames kina naanind e aabjitoowaad iw Anishnaabe

Pii gnamwaad maage mdewechgewaad.

Anishnaabe kinoomadwining e aabjitoowaad iw gwetchginaadwin,Anishnaabeg kinoomaagnag gaa zhittowaad e aabjichgaadeg gi kinoomaageyin nake ge chigeng gi gtaamgwendaagwak gaa chigeng. Nwaaswi mnik gdi daapnaanon chibaa shkaataayin, naanind maanaadendiwin odi Canada yaamgad ge Sixties Scoop minwaa iw Truth an Reconciliation Commission. Giw kinoomagzigig wda kendaanaawaa nake ge zhi wiidookaawaad Anishnaabeg.

“Gaawiin pane kinoomaagesiiwag omaa kinoomaagewgamgong. Zinaagenmoog giw kinoomaagnag gi kinoomaagewaad,” iw kiddo Furdyk.

Ewiingezwid wdi gnowabdanaawaa niw ngamwinan mii giw ge kidwaad bkinaageyin Gwechkinaadwin. Midaawswi-shi-naanan mdaaswaak mnik gii gwetchinaadwak 2023 noogom dash niizh-tana shi mdaaswaak gwetchkinaadwak. Naanan mdaaswaak zhoonyaa gdaa yon pinaageyin ge wiidookaagiyin kinoomaagwegamgong , niizh ekinoomaagzigig daa pinaagewag,

“Gtaamgoziimgad iw kendaagziwin biijgaadeg iw Anishnaabe mdewegnan,” kido Furdyk. Wdi zhittonaawaa giw ekinomaagewzigig gi aabjitoowaad minwaa ji toowaad enenmowaad oma e mdewetoowaad. &



NAKE EZHITCHGENG



TECHNOLOGY AND SOCIETY

Gda dawemdaam ma Your Voice is Power gwetchinaadwinan
odi kinoomaageyin? Dowaabdon omaa:
yourvoiceispower.ca/teacher_cheklist



Ebgbaakigaadeg Computer Science E chigeng

Kina Ezhiwebak

Edizhindang: Ji mkamon iw e Maadaadooyin ji Weshtooyin

Ekinoomaagooyin

> Dewengaadeg ji kinoomaagooyin:

- Mnik ge dnikaayin ,ji maadaadooyin ji weshtooyin, minwaa ji dowaabdamon ge wewiib ayaamgak ji shkwaatong
- Nake ezhi kendnmon iw maadaadooyin ji weshtooyin aabjitooyin taadwinan
- Wzhitoon ge wiindan minwaa gwejtoon iw maadaadooyin ji weshtooyin

> Gezhi Gtaamgooyin:

- Gnowaabdon ezhi nookiim gak maadaadooyin ji weshtooyin
- Wzhitoon ge wiindan nake ge zhi dowaabdamong maadaadooyin weshtooyin
- Mii iw nake ge chigeng

> Ge Gwedweyin:

- Waagnen iw maadaadooyin ji weshtooyin?
- Waagnen iw doowaabdon maadaadooyin ji weshtooyin?
- Anii nake ezhi naasaabwong iw maadaadooyin ji weshtooyin?
- Gdaa shkitoomin naa ji wzhitooyang iw ski maadaadooyin ji weshtooyin?
- Aniish nake gezhi gwexseg mnnik iw maadaadooyin ji weshtooyin aabjitooyin iw gaa shkonmon?



Baabookbidoonangeg

> Mkwenjigeyok

Naanan mnik gdi miingo ji shkwaataayin

Endowaabjigaadeg emyaa shpendaagwak omaa computer science. Iw computer pooch noojigoji omaa gaa shkanaan dowaabjigaadegad ji mkang e gejmind. Nooji wdi zhitoonaawaa giw computer scientist iw maadaadooyin ji weshtooyin. Giw computer scientist dowaabjigwewag ezhi nookiimgak gyak niw maadaadooyin ji weshtooyin mii iw time complexity ezhinkaadeg kina wdi gnowaabdaanaawaa ji kendmowaad emaa mnendaagwak. Giw ekinoomaagzijing washme e wepanak wiinwaa wdi yaanaawaa gi kendmowaad nake ezhi aabiyaad taaswinag.

Nswi maagego niwin ekinoomaagzijing da mowndoshkaawag. Bezhig ge taadwin wga yaa naawaa. Bekizh ge zhibiyyaatig ge mzinigan da yaa naawaa pii ni shkaataawaa mi iw pii ji wzhitowaad ge ji wiidmaagewaad gaa mkaajgaadeg omaa maadaadooyin ji weshtooyin.

> Ge chigeng

Naanmidna-shi-nanan mnik gdi miingo ji shkwaataayin

Taadwinan gdi miingo ji dowaabdamon niizh maadaadooyin ji weshtooyin: linear and binary searches,

Ge Chigeyang 1

Linear Search

Nake gezhi dajiikeng:

1. Kinoomaagan wdaa naanaan bezhig taadwin. (e.g. the three of diamonds)
2. Nsaami'ing taadwinag biwaag megwaa giwtaabwad giw edazhiikewaad,Gda migbinaag giw taawinag (gnowaabdon iw 2 activity gi kenaagwak ge ji sindwaa giw taadwinag)Mi iw ji kendaagwak daa niizho nookiimgad iw linear search
3. E ezhiwak giw edjiikewaad wdi daapnaawaa niw taadwinan mii dash bigidnad gii waabdomwaad e aawid taadwin.Nshkwaasemgad pii wiyaa mkang iw target taadwin minwaa binang noojiwaa ji waabdong.
- 4 Da mowndo dgii kewag kinaa giw eshkwaataawaad ntam mii giw epinaagewaad.

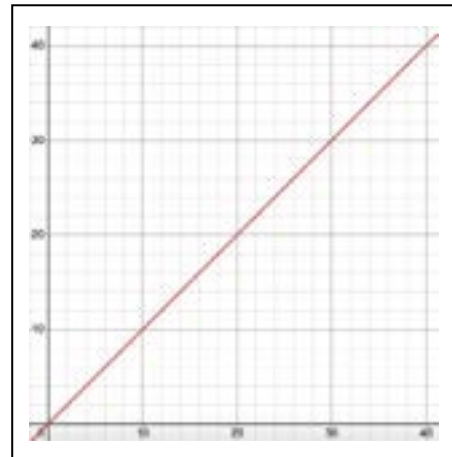
Washme mchaamgad iw linear search pii kenjigaadeg mni e zkanigemgak iw computer

minwaa pii kendang computer ge edowaabdong. Migbizh giw taadwinag minwaa maaji dizhiikeg minwaa naasaab ow target taadwin aabjichgaazo.

Mii gi kendmowaad giw ekinoomaagzijing mnik e dnikaang gi mkawaad ow target taadwin, minwaa wewenaa gi dowaabdamon. Gego kina taadwinag aabjiaaken miidash minwaa ji dowaabmad ow target taadwin aajitooyin iw linear



search.Ji waabdye weyin kina dengwy taadwin, gjibizh.chibaa maajtaayin dowaabjigeyin.



Ezhi waabjigaadeg nwenged ow data ge time oma linear search. Mi iw x-axis mnik data minwaa iw y-axis mi iw time.

Echigen 2

Binary Search

Iw binary search maajtaamgad pii kina gaa zagaknamon gyaksidemgak,kinaa giw taadwinag da gkakzigwag chibaa maajidajiikeng. Nooji gda gyasemaag giw taadwinag enaazwaad maago epiidengaaziwaad nake. Da aabji'aa aces ge two's goopii king dagoshnaan miigo minwaa (diamonds, hearts, clubs, ge spades) naasaab ge chigeyin. Da kenjigaade ow target taadwin yaad.

Binary searches nookiimgad pii kina kenjigaadeg mnik egnaawenjigaadeg minwaa aa'aapta sindwaa giw taadwinag ge pii mkaawaawaad giw ekinoomaagzijing niw target taadwin . Nake gonaa giishpin ow wid seven of hearts owid ow target taadwin gda aaptoo maadmin giw taadwinag maanoo 26th taadwin da owi ow target taadwin. Miigo minwaa gi aaptoo sindwaa giw taadwinag miidash 13th taadwin ji owid ow target taadwin miigo minwaa naasab ge chigeyin gopii target taadwin wiin eta yaad.

Nake gezhi Dazhiikeng:

- 1 Zakiw taadwinag ji mno weshzindwaa. Iw nake aazhi gaa wiindaagooyin (aces

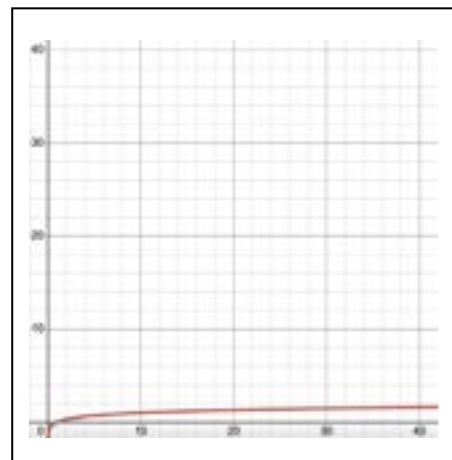
through kings, diamonds, hearts, clubs, ge spades)

- 2 Aaniish mnik taadwinag eyaawaad? Aapto shey giw taadwinag
- 3 Giigi'iing aaptaa gaa saag taadwinag naanin gaa niisbinaag. Giishpin target taadwin naagzid ga shkwaase dbagiswaan. Gliispin waabmaaswad wiindmaagen pi iidog yaad ow target taadwin.
- 4 Miigo minwaa ge chigeng goopii dbagiswaaad shwaataamgak.

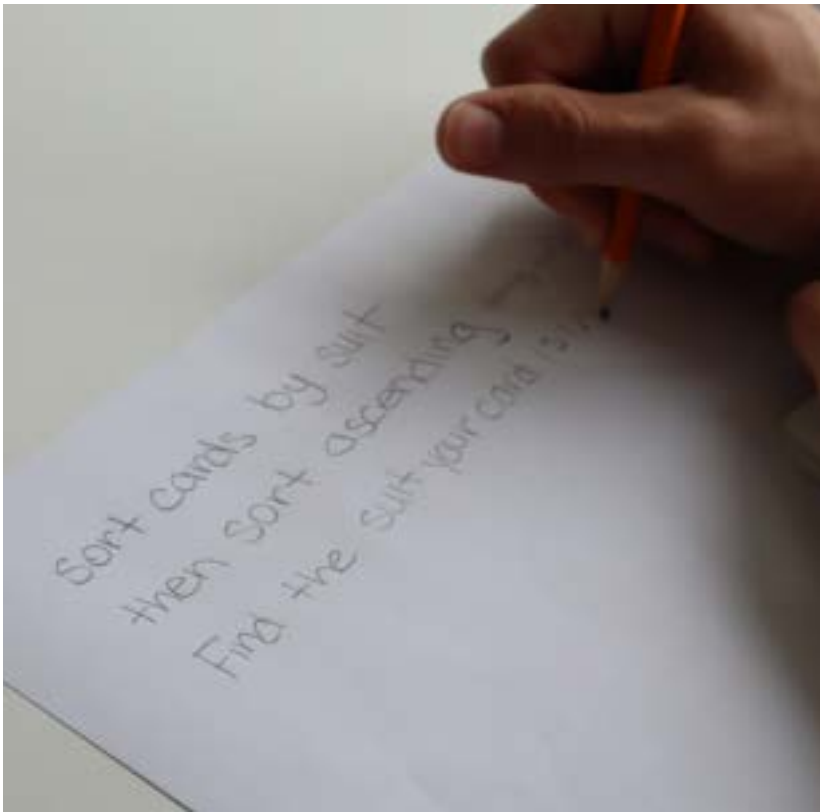
Washme dbe'iing dnikaamgad ji mkaajaaged iw linear search mnik e taamgak gnawenjigaadwin. Gwejim eknoomaagzijing waagnen ge gweksemagak giishpin washme niibwaa yaamgak iw gnawenjigaadeg,

Echigeng 1 waab dy' weng iw dowaabjigaadeg washme dbe'iing dnakmigad iw linear mnik eyaamgak iw gnawenjigaamgak. Binary search logarithmic shwiin linear kidwaa,

Pii washme gtaamgwiinak iw egnaawenjigaadeg mii ge iw dowaabjigaadeg washme mkaamgak niisbide mkik e djiikeng, mii iw logarithmic graph ge wiinmaaged nake.



Mi iw logarithmic graph e owang. Mii iw e wiindaamaagyon ezhi mkchaamgak iw gnaawenjigaadeg ge mnik ge dkikaan. Mi iw graph ge waabjigaadeg mnik x-axis iw data minwaa y-axis iw mnik time eyaamgak.



Echigeng 3

Wzhitoon Gedowaabdamon ge Weshsidooyin:

Wiindomow giw ekinoomaagzijig gi weshzi aawaaa gi taadwinan ge ji mkaawaawod niw target taadwin. Pooch go kina giw taadwinag wniib-deshwag ge be' beshig wdi daapnaawon niw taadwinag.

Gwejim giw Ekinoommaagzijig:

Kenjigaademgad na gezhi wesh zidwaa giw taadwinag washme gi wewiibtang?

Kenjigaademgad na gezhi mkawaad ow target taadwin washme ji wewiibtang? Maanoo da mowdoshkaawag ji gwji gwedwewaad enend-mowaad , giipshpin kenmoswaad neyaab daa dowaabwag minwaa odii algorithms ji wiidookaakemgad odii niw taadwinan temgak.

Gwejim giw ekinoomaagzijig mnik gaa dkikaawaad Echigeng 3.

Wahme naa gii dnika gi mkaawad ow taadwin?

Giishpin washme ezinaagak wii jitooyin maanoo da zhibiigewag giw ekinoomaagzijig miidash iw kina bekaanzid ge maadaadood ezhbi-igaademgak. Gchi nishin iw nake chigeng.

 **NAKE EZHITGENG**

 **COMPUTING AND NETWORKS**

 **GEGOON EZHKONMON**

> **Nake**

Aabjichganan e daawenggaadeg:

- Taadwinag
- Mzinigan ge zhibiinaatig

> **Gaa zhiwebak**

- Waagnen gaa nookiimgak?
- Waagnen gaa nookiimgasnook?
- Waangendash?



EXPLORE AI

THE USAGE & HISTORY



Digital Aabjichganan

MEWJA GAA ZHWEBAK

Gdaa mkaanan iw *Root & STEM* odii ✨ rootandstem.ca giishpin mshi waabdoswan

Gii jitoomin niibwaa aabjichganan ge aabjittod kinoomaagnag aabjitoowaad computer kinoomaagewnan—minwaa iw podcast ge iw ge djiikmowaad. Dabi yaamgad iw link.

Root & STEM Podcast

Kina gwejmaawag ji aabtoonmaadwad ge gi miigwewaad ekanjgaadeg. Iw taam mzinigan dabaajdaan iw computer kenjewin iw nake STEAM kinoomaagewin. Midaaswi-shi-naanan maage Nsimdana mnik eta chibaa shkwaaseg mii odii Ampere website ji mkaaman ✨ rootandstem.ca/learn/the-root-stem-podcast

Root & STEM App

Mii naasaab etemgak gaawiin memkaaj gdi dbiziin aabjichganan wegwenchidogo daa aabjitoon gi kendang maage ji kinoomaagozid. Gdi miingoo ge pane gegoon wdi toona eshkiniiwong ge aabjitooyin.

Daapnaamon ge Wiidookaagyin: The Digital World Podcast

Nswi tenoon ge aabjitoowad giw ekinoomaagzijig megwaa kenda-mowaad iw e wnishisnook ji boonendmowaad. Emyaawendaagwok omaa digital world: kendaaswin, social media, minwaa kinomaage-win. Da wiidookaagnon ow ekinoomaagzid nake ge zhi aabjittod ji wiidookwind.

✨ rootandstem.ca/learning/harnessing-the-benefits/

AI Kina Ekendaagwak

Ganwaabdamond iw da kendaan nake mewja gaazhi kendaasing (AI). Gaa jitchgaademgak iw AI ge gaazhi kinwaabdomwaad ji wiidookaazong. Da kendaan ow kinoomaagzid gaa zhinaagwak mewja ge mnik ghazi niigaanbizod, noojwiya gaa wiidookaagnon iw AI-powered technology.

✨ www.youtube.com/watch?v=iencUcExpRo

Nake ge zhi Wesidooyin iw Computer

Ga wiidmaagon iw nake ge zhi wesidooyin ge ezhinkaadeg aabjich-ganan ge giin ji dbendon iw computer.

✨ amp.ca/learn/how-to-assemble-a-computer

Gon' Phishing

Gon' Phishing zhnikaademgad iw ge dazhiikman mi iw ge wiidookaag-yin noojgegoon gi mno aabjitooyin iw computer. Giispin wniseyin da mooshkne iw inbox.

✨ amp.ca/learn/gon-phishing

KINOOMAADWIN 1

Wzhitoon aabjichgan ge wiidookaagyinpi bgishnan

Zhibiiged wii Science Buddies

Level: Grades 9 to 10
Subject: Computer Studies
Software: micro:bits

Kinoomaagewnan Links

Iw mzingan niizho temak odii provincial minwaa territorial computer studies curricula for Ontario Grade 10.

> Computer Science:

AI. Computational Mkwenjewin, Waa zhiwebak minwaa Ezhi chingeng

Kinaa aabjitoon ge noojigegeon aabjichgan aabjitoon ji wzhitooon ge ji moown-dotooyin gaa makamon

B1. Ji kendon ezhi nookiimgak iw Hardware ge Software

Kenjigaadeg ezhi nookiimgake ge e zhi aabjitooyin pane

B2. Aabjitooyin iw Hardware ge Software

Kenjigaadeg ge nsotaagemgak iw hardware ge software megwaa aabjitooyin zagaknamon e shonmon ge aabjichgaadeg odii digital technology

C1. Gezhtchigeng ge Ewiidookaagemgak

Ji nsitaamgak niw ewiidokaagemgak

C2. Zibiige Programs

Washme ewepanak wjitoon demgak

> Aabjichgan:

- Micro:bit Go Bundle. Kina temgak ge aabjitooyin ji maataayin omaa micro:bit:
 - Micro:bit ndabsak
 - Micro- USB cable
 - Battery ji tooyin
 - AAA batteries (2)
- Computer with internet access an USB prt

Eknoomaagzijig waa zhitoonaawaa aabjichgan e gaashiiwang gbiidaagning ge depsh-kineng ji wiidookwaad ow e aakozid maage gaa bigishing maage wiya e dewendang ji wiidookwind.

> Kina waa kenjigaadeg:

- Ji kendmon ezhi aabjichgaadeg niw aabjichgan e wiidookaagemgak
- Ji kendmon emyaa ntaa nokiimgak aabjichgaadeg gbe'ing maagego jinaa
- Ji kendmong nake ge ji aabjitooyin niw microphones, light sensors an accelerometers minwaa ji shkitooyin ji gidmon e zhibiigaademgak

> Kidwinan:

- **Aabjichgan:** Ge nketaagegiimgak ge ekendaang ezhiwebak
- **.Aabjichgan e wewiibshkamgak::** Washme e gzhiikaamgak
- **Aabjichgan e aabjichgaadeg washme di dkiikaayin;** Aabjichgan enaabjitooyin washme ji gzhiikaamak maage washme di dazhiikaayin
- **E wiikbidemgak::** Gdi wiikbingon washme ji nsaami aki ji yaayin : Aabjichgan e wiidookaagemgak ji kenjigaadeg bigishnan
- **Ewiidookaagemgak ji kenjigaadeg bigishnan**
- **Fall monitor:** Getzisiyag wdi aabjitoonaawaa. Mi iw e aabjichgaadeg ge wiindaamaagenh pii bignishnan
- **Medical alert device:** Aabjichgan e aabjichgaadeg kina gi kenjadeg ezhiwebziwaad giw e kowaabmindwaa
- **Medical alarm:** E biingwewemgak dewenjaadeg wewiib wiya ji bi yaad
- **Pitch angle:** E aasmiseg ge nsaami line (bevel gear) zhinkaade
- **Light-emitting diode (LED):** Aabjichgan e waaskonemgak pii electric current biinji bmimdeg.

> Wiidookaagewnan ge Gwedweyin:

1. Waagnen e wiidookaagemgak aabjichgan e yaamgak biinji micro:bit?
2. Aanish ge ndinman niw aabjichgan ge wiindaamaagemgak pii bigishnan ?
3. Waanen edawendman biiji iw micro:bit?

Maajtaamgak

Niw aabjichgan e aabjitooyin washme ji wewiibshkaayin wdi toonaa waa omaa video dzhiikewin aabjichgan minaa giigdoobiiwaabkoons. Mii iw jikendmon epiijibisyyin. Niw edzhiikmon e dawenjaadeg washme ji gzhiibsoyoin. Mi ge jiw e ji kendmon nake ge zhaamgak maage goo giiji'ing maage niisi'ing yaamgak. Pii shwe'ing yaagak iw giigdoobiiwaabkoons mii kenjaadeg ji gyaksing.

Noojigegeon temgadaan omaa micro:bit ge washme ji gzhiibzoyin temgad.

Computer Activity

> WAAZHITCHIGENH 1

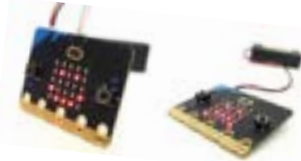
Ezhki'ing zhitoon iw MakeCode program ezhinkaadeg, mii dash iw Bigishnan zhoomiigweni dengway MakeCode website ji makamon makecode.microbit.org/S92388-40846-91439-76595.

Mi iw omaa micro:bit ji waabdamon iw dengway, da chinen-dang zhoomiigweni da gyak gaabwi giishpin maanaadatang da wenaakshin. Ji maataayin aabjitooyin iw micro:bit. Mi iw ge maadaadooyin: microbit.org/get-started/getting-started/introduction

> WAAZHITCHIGENH 2

Download iw zhoomiigweni dengway program odii micro:bit. Temgak miidash di gwejtooyin:

- Naaniib witoon micro:bit. niigaaning nake ezhi waabdamon shwe'ing omaa mzinaazwining naami.ing. 90 degrees gdi shpinaan. Waagnen iw micro:bit ewaabdyewemgak?



- Mii dash minwaa gi bmaaksidooyin iw micro:bit maanoo iw LEDs gijji'ing da jisin. zero degrees dash naagwad. Waagnen iw micro:bit ewaabdyewemgak?

- Bangii binan iw micro:bit niigaan midash iw LEDs niisii'ing ji naagwak (gijjiing nbinan midash iw LEDs ji waabjigaadeg) 180 degrees dash shpinaanmagad. Waagnen iw micro:bit ewaabdyewemgak?

> WAAZHITCHIGENH 3

Gnoowaabdon iw code odii MakeCode site ji kenmond nake ezhi nookiimgak. Gnamaa gda kendaan iw program. Iw code wdi wiin-mawaan niw micro:bit giishin pitch angle besho maago go waasa temgak da maanaadendam zhoomiigweni dengway. ELSE, mnowaan-gwendam dengway,” Pane daa debwemgad iw if statement giishpin banjii niisaaksing iw angle2 da aansegad, giispin dash niibwaa niisaakseg iw angle2 miigo minwaa ji aansemgak. Giishpin iw micro:bit naaniibwiimgak e mnendaagwak dengway da yaamgad, giispin gwiseg emaanaand dengway da yaamgad.

> WAAZHITCHIGENH 4

Aanjtooin angle1 ge angle2 variables minwaa ndo waabdon ski code. Aanish gaa zhi webak pii gaa mkchaatooyin? Gaazhiiwong? Naagdawendong gaa taa nookiimgak pii ebishing wiya megwaa yaang iw micro:bit.

> WAAZHITCHIGENH 5

Aabjitoon Science Buddies-Engineering Design Process wiidookaazwinan (niisi'ing dowaabdon link) ji zhitoyin iw aabjitchigan. Gaawiin wiya wnisesii maajigo echigeng gdi debwe, gdaa gjitoonan naanind omaa e dgoosnoogak:

- Ewiidookaazwin zagaagokan daa temgad omaa A block nami iw Input omaa MakeCodeMaker.
- Maanoo da dewemgag iw micro:bit. megwaa waabdamon iw LEDs.
- Baamendon iw on shake block nami Input. Mi iw ge nendamaaged iw maajishgaad ow micro:bit. Aabjitoon iw wewiibshkaawin (aabjitoon iw drop-down) Gdi kendaan na e wiindaamaagoyin?
- Baamendon iw on loud sound block, Mii naa naasaab entaagwak pii wiya bgishing maago wiya biibaagid ji wiidookwind?

> WAAZHITCHIGENH 6

Gwejtoon iw bgishnan aabichgan

- Aabjitoon iw battery pack ge edgoseg omaa micro:bit. Gaawiin dash memkaaj gdaa aabjitoosiin electricity power.
- Yoon maagego wiya gwejim di biiskang, biindaagna'on maagego zagagookan gwinaaning.
- Gweton wewenaa ji bigishnan? Gii kenjgaade na wiya gii bigishing? Giispin gaawiin aanjitoon iw angle1 minwaa angle2,

Shkwaataamgak

Pii gii shkwaataamgak, giw ekinoomaagzjig daa kendaanaawaa iw micro:bit minwaa gi washme mnobdemgak iw code.

Wiidookaazwinan:

- Micro:bit Educational Foundation—Maajtaawin (microbit.org/get-started/getting-started/introduction)
- Microsoft MakeCode—Biimskonan (makecode.microbit.org/reference/input/rotation)
- Science Buddies—zhibii gaagaadeg ji maajishkaayin (sciencebuddies.org/science-fair-projects/references/accelerometer)
- Science Buddies—Engineering Design Process (sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-process-steps)

KINOOMAAGEWIN 2

Mi iw Arduino e aawong

Zhibiiged wii Science Buddies

Level: Grades 6 to 12

Subject: Computer Studies,
Art/Arts

Software: Arduino

Kinoomaagewin Links

Iw mzingan niizho temak odii provincial minwaa territorial computer studies curricula for Ontario Grade 10.

> The Arts:

A2. Elements and Principles:

Aabjitoon emyaa shpendaagwok pi wzhityin mage wii weshtoyin maagego pii waabdyeweyin .

A3. Tool, Techniques and Technologies:

Noojgo gegoon aabjitoon, minwaa nooji nake zhitoon, minwaa iw Technologies ji wiindaamaageyin nake ezhi nookiimgak iw gaa zhitooyin

> Computer Studies:

A1. Computational Thinking, Planning, and Purpose

Mowndoo aabjitoon mkwejgewin mniwaa gaa chingeng, minwaa noogegoon aabjitoon aabjichganani ji mowdoo mkamon kina ga dowaabdamon ge aabjitooyin ge minwaa ge aabjichgaadeg.

B1. Understanding Hardware and Software

Waabdyewen minwaa kendan ezh nookiimgak kina niw hardware ge software pane iw bmaadziwin.

B2. Using Hardware and Software

Waabdywen ge nsotan nake ezhi aabjichgaadeg iw hardware, software minwaa zagaknigewin minwaa gaa mkaajgaadeg ji widopokaagak iw digital technology

C1. Programming Concepts and Algorithms

Wiindaamaagen zhi nookiimgak iw fundamental programming concepts an algorithms

C2. Writing Programs

Nake gezhi zhibiiman niw fundamental programming

Ekinoomaazijig da kendaanaawaa nake gezhif zhitoowaad iw circuits and programming a microcontroller (naasaab nake ge ji aabjitoowaad iw(Arduino Uno) ji wiidokwad ge ji gnoonad naanind e aabjitoowad iw Arduino.

> Abjichganani:

- Arduino UNO
- Science Buddies Electronics Kit for Arduino, available from Home Science Tools
- Computer
- USB-C to USB-A adapter (Giw gaa wiin wiikaa niwaabjitoosiinaa waa USB-C ports)

> Kinoomaagewinan ge gwejtooyin:

- Zheyaaknan iw Arduino Uno bagsag minwaa upload code.
- Weshtoon aazhi etemgak Arduino program

> Kidwinan:

- **Arduino** : Ge aabjitooyin washme ge wenpanak aabjitoong iw hardware ge software
- **Microcontrôleur**: Aabjichgan enaabjitoon nake iw microprocessor
- **Robotics**: Aabchigan enaabjitooyin ji zhittoyin minwaa ge ji jinaagwak ge nake ge ji mnobideg

> Wiidookaagenan ge Gwedweyin:

1. Aanii mnik e kendaagziyin niw robotics?
2. Oondi ji aabji'ad waa giw robotics

Maajtaamgak

Iw kinoomaagidwin miinaawag nake ezhi nookiimgak iw Arduino Uno nbaksag giw ekinoomaagzjig. Arduino zheyaknan ji kendman nake ezhi noojiingak ji zhibiimon ge ji upload programs, minwaa ji wzhitooyin e gaazhiiwang circuits and interfacing with inputs an outputs like buttons an LEDs. Mi i iw ge aabjichgaadeg pii wzhitoo-
yin niw robots, drones, voice-controlled appliances etc.

Computer Activity

> WAAZHITCHIGENH 1

Ge dinmon ji tooyn iw Arduino IDE open source software
<https://www.arduino.cc/en/software>.

NB: Arduino IDE pane gnwejigaade ge pane update wdi toonaawaa

> WAAZHITCHIGENH 2

Zeyaaknon Arduino. Maadaadon i kidoomgak.

> WAAZHITCHIGENH 3

Naabjitoon iw Arduino Uno nbaksag odii computer with a USB cable.

> WAAZHITCHIGENH 4

Click iw **Select Board** mii dash ji bi niisbideg menu mii dash **Arduino Uno** ge dawendmon

> WAAZHITCHIGENH 5

Debnon **File**, miidash **Examples**, miidash **01.Basics**, miidash **Blink** ji zheyaaknamon iw built-in Blink example program.

> WAAZHITCHIGENH 6

Click iw **Upload** zaakoon miidash ji upload iw Blink program omaa Arduino Uno nbaksag

> WAAZHITCHIGENH 7

Gnwaabdon iw Arduino Uno nbaksag. Iw onboard LED da giibiigetag jina, mii dash ji aateseg jina mego minwaa ge jiwebak.

> WAAZHITCHIGENH 8

Kina gidan iw Arduino code annotated.

```
// the setup function runs once when you press reset maage power
// the board
void setup() {
// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
}
// the loop function runs over and over again forever
void loop() {
digitalWrite(LED_BUILTIN, HIGH);
// turn the LED on
// (HIGH is the voltage level) delay(1000);
delay(1000);
// wait for a second
digitalWrite(LED_BUILTIN, LOW);
// turn the LED off by making
// the voltage LOW
delay(1000);
// wait for a second
```

NB: If students have no prior programming experience, supplement the video with further explanation. See the resources section for the link to the code.

> WAAZHITCHIGENH 9

Weshtoon iw program chi nookiimgak two seconds minwaa chi nookiimgasnook half a second.

NB: Explain that the delay command uses milliseconds. There are 1,000 milliseconds in 1 second.

Shkaasemgak

Gii ni shkwaataawaad giw ekinoomaagzjig wгаа kendaanaawaa iw basics of the Arduino Uno board minwaa iw Arduino IDE, miidash ji shkitoowaad ji maajiishkaawaad minwaa noojigegoon ji mkamwaad. Bezhig eta iw Arduino kinoomaagewin yaamgad niib-waa minwaa gdaa maakaanon omaa:

www.sciencebuddies.org/teacher-resources/lesson-plans/introduction-to-arduino

Resources:

- **Arduino**
(arduino.cc)
- **Technical Specs of your Arduino Uno board**
(arduino.cc/en/Main/Products)
- **Nake gezhi aabjitooyin iw Arduino**
(sciencebuddies.org/science-fair-projects/references/how-to-use-an-arduino)
- **Language Reference**
(arduino.cc/reference/en)

Code Phi Spirals

Zhibiiged wii Ampere

Level: Grades 9 to 10
Subject: Computer Studies
Software: Scratch

NB: Washme e kenjewaad ji aabjitoowad iw Scratch

Kinoomaagewnan Links

Daabshkoo giw provincial computer studies curricula for Ontario Grade 10 aawon mzinigan.

> Computer Studies:

A1. Computational Thinking, Planning, and Purpose

Ji mowndoonmaan kina nmoojgegoon wiyaa ji aabjitoowad ge ji gwejtood

B1. Nsitman iw Hardware ge Software

Pii aabjitooyin pane g'gaa waabdye we nsitman.

B2. Aabjitooyin iw Hardware ge Software

Waabdyewen nsitman ji aabjitooyin iw hardware ge software ge zaknigaasing minwaa ji nsitman iw nake ge zhi dowaabdamon omaa digital technology

C1. Gezhtchigeng ge Ewiidookaagemgak

Ji nsitaamgak niw ewiidokaagemgak

C2. Zibiige Programs

Washme ewepanak wjitoon aabjitoon fundamental programming nake ji ziibiigeyin demgak

> Aabjichganan:

- Computer ge internet
- Scratch accounts (wzhittoon giishpin odii scratch.mit.edu)
- Scratch Example scratch.mit.edu/projects/888242258 temgad)

Ekinoomaagzijig ga aabjitoon naawaa phi gidaaswinan ji weshtoowaad ji wzhitooowaad iw phi spiral omaa Scratch

> Kinaa waa Kenjigaadeg:

- Kendan niw phi giddaaswinan ge iw golden ratios
- Wzhittoon iw wiyaa ji zhitood iw phi spiral omaa Scratch
- Kendan iw code ge ji nsitman iw nake ezhichgaadegmgak omaa Scratch

> Kidwinan:

- Phi gidaaswinan/Golden ratio: niizh gidaaswinan biitwaaing ji daabshko yaamgak gidaaswinan 1.618 mi iw Phi Gidaaswinan/Golden ratio e aawang
- Mnik enendmon gnamaa washme daa mkchaa megwaa gii gidaasaasyin mi iw Variable e aawang
- Naasaab ge zhinaagwak megwaa nookiimgak mi iw mathematical operators e aawang

> Wiidookaagewnan ge Gwedweyin:

1. Waagnen iw Fibonacci sequence e aawang minwaa oondi ji aabjitooyan?
2. Waagnen iw coding? Waagnen ntam ge zhichigeng chibaa aabjitooyaan iw code?
3. Waagnen iw phi spirals? Aanish nake ge zhi wiidookaagemgak oma symmetry in nature?

Computer Activity

Ekinoomaagzijig wdaa zhitooonaawaa iw code odi Scratch ji maajtaamgak iw phi spiral, miidash washme waasaa daabimde mii ge zhiwebak aabjitton iw phi biimskose goding pii giwtaabzod.

> WAAZHITCHIGENH 1

Zheyaaknon iw Scratch account. Debnon iw Create mii dash ji wzhitoooyin ski ni ii. Wiinan iw gaa zhitoooyin “Phi Spiral Sequence”.

> WAAZHITCHIGENH 2

Mzinbii’an niizhwaaswi sprites.

- A dot ezhnikaadeg **Sprite1** wzhittoon aabjitooyin iw etiskaadeg zagaakogan odi **Costumes** tag yaagak
- A blank eshinikaadeg sprite mi iw **Centre**
- A zagkookan ezhnikaadeg **Pi π** mii ge zhinaagak
- A zagkookan ezhnikaadeg mi iw **Golden Ratio**
- AS zagkookan ezhnikaadeg **E** (Euler’s Number e aawang)
- A Sprite ezhnikaadeg **22/7**
- A zaagookan ezhnikaadeg $\frac{1}{4}$ **Turn**



Niizhwaaswi variables ji toon:

- angle
- clone#
- Number of colours
- Step
- Turn ratio
- Turn ratio denominator

> **WAAZHITCHIGENH 3**

Megwaa aabjitooyin niw niisi'ing etaamgak dagoonan iw base code nake kidwinon odi **Pi**, **Golden Ratio**, **E**, **22/7** minwaa iw **1/4 Turn** zagag-okaan. Chi-chigeyin iw:

- Daapnon bezhig zagakoons
- Dagoonon iw **sprite clicked** block odi **Events** category
- Dagoonan iw **set_**ji ngaab dooyin iw **Variables** category midas dagoonan iw **turn ratio** block gaa zhitoonyin odii Step 2

Toon niw variable values ji ngaab dooyin omaa nake:

For Pi

- Variable value: **3.141592653589793238462643383279**



For Golden Ratio

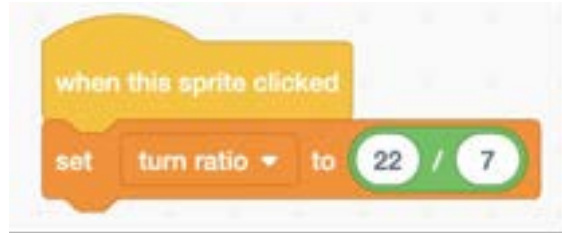
- Variable value: **1.618033988749894848204586834365**

For (E) Euler's Number

- Variable value: **2.718281828459045235360287471352**

For 22/7

- Go to the **Operators** category. Enter a **() / ()** (division) block in the **set to** block. Enter **22** in the first space and **7** in the second.



For 1/4 Turn

- Variable value: **0.25**



> **WAAZHITCHIGENH 4**

- Code the Sprite1 dot. Dagoonan pii waabjigaadeg zhaawaask-waa ogikikwe'an **when green flag clicked** block frin rgw **Events** category, minwaa a **set (my variables)** to block from the **Variable** category. Set my variable to clone# and enter 0(zero)b in the value space.
- Dagoonan iw forever block from the Control category. Biji'iin iw block, dagoonana **turn_degrees (clockwise)** block from the **Motion** category. Iw code ewiindaamaaged ji biimskod pane clockwise.
- Place a **() / ()** block from the **Operators** category inside the **turn ___ degrees** block. Select **turn ratio** as the variable in the first space and enter **360** as the value in the second space.
- Dagoonan iw **change_by** block from the **Variable** category. Debnon iw **clone #** as the variable ji miinad iw **1 (bezhig)** for the value. Mi iw ji kenjigaadeg iw one clone ji wzhitchgaateg goding. Wewiib taamgad iw Scratch, miidash ezhi nendaagwak niibwaa clones zhitchgaadeg, Mii ji wiindamowind ow code mnik clones ge zhitood.
- Omaa **Looks** category, wzhistoon iw enaadeg **set colour effect by** block naami iw previous block. Minwaa go **() / ()** block in the value space. Ntam value of the **() / ()** block, zhibii'an **20**. Miidash toon, **Mod** block from the **Operators** category. Iw ntam **Mod** value space, ntoon iw **clone#** variable. Miidash, ji tooyin iw **number of colors variable**.
- Nshkwaaj ge chigeng. Add a set **color effect to** block from the **Looks** category. Place another **() / ()** block in the value space. Enter **20** in the first space and a **__ mod __** block from the **Operators** category in the second. In the **__ mod __** block, enter the **clone#** variable in the first space and the **number of colours** variable in

the second. This code specifies how many clones will be created and the frequency of colour changes.



> Waazhitchigenh 5

Pii zhaawaashkwaa ogikikwe'an waabjigaadeg mi iw pii ge kenjigaa-deg mnik dots ge engokwaamgak dots omaa Sprite1.

- 5.1 Dagonan iw **change size by** block from the **Looks** category an enter **0.25** as the value.
- 5.2 Dagonan iw **change colour effect by** block from the **Looks** category. Biiiji iw value space, enter a **()/()** block from the **Operators** category. Enter **200** in the first value space a **a number of colours** variable block in the second. This tells the code to change the color of the dots as the spirals increase maage decrease in size.
- 5.3 Dagonan bekaan **change colour effect by** block an enter a **()/()** block in the value space.
- 5.4 Within this operator block, in the first value, add the **()/()** block. In the second value, type **200**. Place the **turn ratio** variable in the first division value. In the second value, place the **turn ratio denominator** variable.
- 5.5 Insert another **()/()** block in the first value space, and enter **200** in the second. In the first value space, insert another **()/()** block. In the first value space of the embedded **()/()** block, enter a **turn ratio** block from the **Variables** category. in the second, enter a **turn ratio denominator** block from the **Variables** category.



> WAAZHITCHIGENH 6

The final, separate piece of the code create a sliding bar that speeds up or slows the rotation of the dots.

- 6.1 From the **Control** category, select a **when I start as a clone** block and follow it with a **forever** block.
- 6.2 Insert a **move __ steps** from the **Control** category in the forever block. Insert **step** from the **Variables** category in the value space.
- 6.3 Add an **if ... then** block from the **Control** category. Insert a **>>** block from the **Operators** category in the value space after **if**. In the value space, place a **>>** block from the **Operators** category. In the **() / (>50)** block, insert a **distance to __** block from the **Sensing** category in the first value space and select **start as a clone** block and follow it with a **forever** block.
- 6.2 Insert a **move __ steps** from the **Control** category in the forever block. Insert **step** from the **Variables** category in the value space.
- 6.3 Add an **if ... then** block from the **Control** category. Insert a **>>** block from the **Operators** category in the value space after **if**. In the value space, place a **>>** block from the **Operators** category. In the **() / (>50)** block, insert a **distance to __** block from the **Sensing** category in the first value space and select **centre** as the value. In the second value space, enter **130**.
- 6.4 In the space in the **if ... then** block, insert a **delete this clone** block from the **Variables** category.



> WAAZHITCHIGENH 7

Gwejtoon iw code by clicking the zhaawaaskwaa ogikikwe'an ji maajta-amgak iw spiral.

NB: Pressing the various zagakoonan (E , π , etc.) gi aajsidoon iw structure of the spiral. Odii wiidookwinanan da temgad iw link ji shkwaataayin.

Shkaasemgak

Giw ekinoomaagzijig wda shkitoonaawaa ji gyak sidoowad iw gaa wniseemgak ge ji shwaakmigziwad iw phi spiral code minwaa gi aabjitoowaad iw code ji wzhitowad niibwaa maage bigiishenh dots minwaa ji alter the degree at which they turn.

Wiidokaazwinan:

- **Scratch Example atch** (scratch.mit.edu/projects/888242258)
- **Scratch Website** (scratch.mit.edu)

- **Waagnen iw Fibonacci Sequence & the Golden Ratio? Ewenpanak windmaagewin ge naasaab eyaamgak pane giizhgak bmaadziwin** (www.youtube.com/watch?v=2tv6Ej6JVho)

KINOOMAADWIN 4

Animate a Sprite with Scratch

Zhibiiged wii Canada Learning Code

Level: Grade 10

Subject: Computer Studies, Art/Arts

Software: Scratch

Kinoomaagewnan Links

This module aligns with provincial and territorial arts, language arts, and computer studies curricula for Ontario Grade 10.

> The Arts:

A2. Elements and Principles

Dagoonan niw key elements minwaa principles odii various arts disciplines temgak pii wii wzhitgeng, maage wii mchaatooyin, ge pii wii waabyeweyin art works, dgonanan ge iw integrated art works/production.

A3. Tools, Techniques, and Technologies

Pii wzhitgeyin nooji abjitoon niw abjichgagan ge nooji zhitchgen ge nake technologies ji mno kenjigaadeg nake niw art works/productions ezhi wiindaamaagemgak niw ge nake ezhi wzhitgeng.

> Computer Studies:

A1. Computational Thinking, Planning, and Purpose

Dagoonan kina niw computational mkwendmon nake minwaa ezhitgeng nake, minwaa kina niw abjichgagan ji wzhitoyin computational artifacts washme niwbwaa daa yaawog waa abjitoowad niw.

B1. Understanding Hardware and Software:

Waabywen minwaa nsitan nake ezhi abjichgaadeg niw hardware ge software pii aabjitoong pane giizhgak bimaadziwin

B2. Using Hardware and Software

Waabywen minwaa nsitan nooji nake ezhi abjichgaademgak iw hardware, software

minwaa zkaknigaajewnan, onmaa iw research practices to support their own use of digital technology

C1. Writing Programs

Abjitoon fundamental programming concepts ji zhibiimon ewenpanak program

Giw ekinoomaagzijing wdaa zhitoonaawaa iw sprite omaa Scratch abjitoowaad code ge algorithms. Wdaa ntaawtoonaawaa abjitoowad iw Scratch minwaa programming sprite giw ekinoomaagzijing

> Giigdowin:

Bzindan washme ji Nsitman, Aabjitooyin iw Active Listening Skills

1.2 *Bzindan pii kinna yaa waad giw ekinoomaagzijing ji kendmon nake ezhi abjichgaadeg iw active listening strategies*

Reflecting Skills and Strategies, Interconnected Skills

3.2 *Kina waabdon nake ezhi abjichgaadeg, representing, gidaaswin, ge zhibiigaazwin ge ji wiindaamaagyin nake ge zhi mno bideg minwaa g'gaa wiidookaagon giigdoyin.*

> Aabjichgaadeg:

- Scratch : scratch.mit.edu/
- Class set of laptopschargers
- Mice
- Headphones

> Kina waa kenjigaade:

- Giw ekinoomaagzijing daa nenmaawag ji abjitoowaad iw code megwaa dowaabjigewaad
- Daa kenjigaade ge daa wiindamaagewag ezhi webaak omaa coding minaa megwaa nookiimgak niw technologies pane giizhgak bimaadzing
- Daa wiindmaagewag nake ezhi abjitooyin niw animations megwaa mno bimaadziyin

> Kidwinan:

- **Algorithm:** Ge wiidookaayin ji wezhtooyin
- **Bug:** Ewinisemgak omaa programming gaawiin dash gyaksnoon iw gaawiin ge mnobdesnoon
- **Debugging:** Ji skitooyin ji weshtooyin gaa mnobdesnok ge egyaksemgasnok omaa code
- **Loops:** Nenmaage daabshkoo sequence of code ji bimbemgak niwbwaa, giishpin predefined conditions are met

> Wiidookaagewnan ge Gwedweyin:

1. Waagnen dash ezhi abjichgaadeg iw animations?
2. Waagnen ewinishiznook omaa animations?
3. Waagnen aazhi e kendmon omaa coding? Waagnen nake enendmman ge abjittoyang ji wzhitoyang iw project?

Computer Activity

> WAAZHITCHIGENH 1

Pii wii nookiiyin online omaa zhaan scratch.mit.edu maage download iw aaplication omaa wii nookiiyin offline scratch.mit.edu/download. Giispin online, wzhittoon odii shwei'ing top left corner.

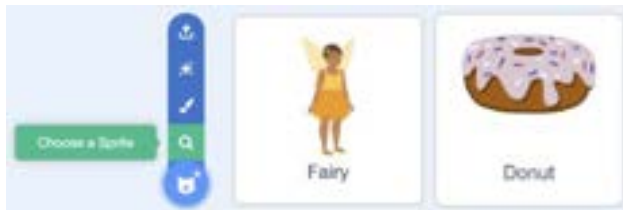
Recommended: Wzhittoon iw account/sign in to save the progress of your project

> WAAZHITCHIGENH 2

Giiwtaashgan miinaandeg **Choose a Sprite** icon mii imaa niisi;ing right corner of the screen, mii dash ji baamendon iw magnifying glass. Baamendon iw sprite waa aabjitooyin. Giiwtaashgan iw sprite ji waab-damon nooji nake e aabjichgaadeg. Naanind bekaan naande noon minwaa nooj zhisnoon. **Costumes** zhnikaadenoon niw.

Advanced options: Giishpin ow ekinoomaagzid wii wzhittoon iw sprite from **scratch** daa giiwtaashaan iw sprite (**Choose a Sprite**) mii dash ji waabdang iw tisque biiwaabik. Niw aabjichiganan omaa step 3 temgak (iw gonaa tisque biiwaabik, line, circle, rectangle) ge wiidookaagyin pii wijitooyi iw new sprite.

NB: Nenin giw ekinoomaagzijig 10 to 15 minutes ji wzhittoowaad niw sprites chibaa geon minwaa chigewaad.

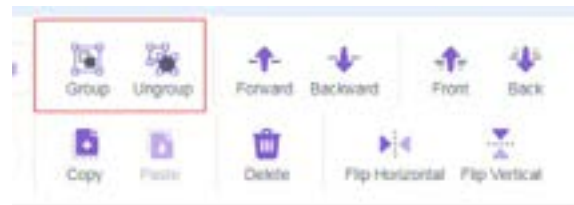


> WAAZHITCHIGENH 3

1. Debmon iw **Costumes** tab ji zhaayin **Paint Editor** temgak.
2. Zhwe'iing omaa left hand side daa tenoon niibwaa sprites. Pii naasaab temgak iw Costume, right click bezhig iw costume, midash ji debnamon iw **duplicate**.
3. Kinaa gnowaabdon niw Paint Editor, mii niw ge aabjitooyin :
 - **Select, stretch, compress or rotate objects** by selecting the parts of the main sprite and adjusting the bounding box that appears when it is selected
 - **Reshape the edges of an object** by using the reshape tool located on the left-hand side
 - Draw new shapes using the **brush, line, circle, and rectangle tools** located on the left-hand side
 - Change colours using the **fill tool** located on the left-hand side
 - Delete elements using the **eraser tool** (located on the left-hand side) or the **undo tool** (located on the top left side, beside the costume name) to correct mistakes



- **Group/ungroup** objects to select specific areas of the sprite, by selecting areas while holding down the shift button on the keyboard. Once the objects are selected, use the **group/ungroup** button, which is located at top left beside the **forward/backward** tool.



- Move selected objects **forwards and backwards** using the tool beside the group/ungroup too



> WAAZHITCHIGENH 4

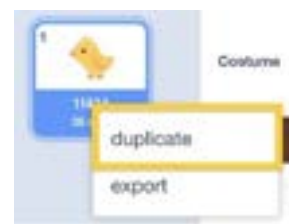
- a) Kenjigaadeg mnik ekendang ow ekinoomaagzid maano da gnowaabdaanaawaa iw program codes an animate the sprite gaa dewendang ensitang. (Eg giispin dengwe gnamaa gdaa dawendaan ji zhoomiigwenid maage maanendom, giishpin my; iingan aawid daa bsmose mage daa migi.)

Giispin znagendang ow ekinoomaagzid maage examples washmne ndewendang chigeng e yaamgak omaa niisi'ing gdaa maadaadoon.

- b) Iw kinomaagewin mii iw chick sprite e aabjichgaadeg example nake ezhi wzhittooyin iw animated loops. Ekinoomaagzijig animate the chick sprite ji zhinaagwak biskijigaabawid ge zheyaaak doonenid. They can refer to this example to apply the concept to their own character to animate their own sprites.

4.1 Debnon iw **Chick Sprite** mii dash ji weshtooyin omaa Costumes tab

- Debnon iw **Chick Sprite** ji zheyaaaknamon iw **Choose a Sprite** icon niisi in the right corner of the screen
- Aanjtoon wdi zhnikaazwin costume "chick-stand" Naasaab zhitoon iw costume right clicking on its icon. "Chick-eat" dash da zhinkaazo



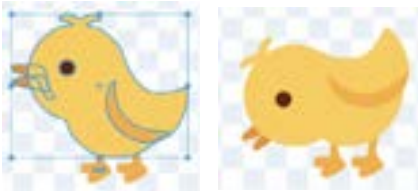
- Debnon iw “chick-eat” sprite, click the reshape tool, then click the chick’s beak. Reshape it so it looks like a thin upper beak



- Debnon iw ski beak object minwaa bezhig zhitoon. Aabjitoon iw shpi’iing beak ji zhitooyin iw niisi beak. Mi ge chigeyin, biimskonon iw new object minwaa zhekaatood shkwei’ing wshtigwaaning ow chick. Biinji “chick-eat” sprite debnon ge mowndonon chick’s beak, shkiinhzhik, naang ge wiyaw. Biimskonon kina miidash ji biskji-igaabwid ow chick



- Debnon iw chick’s beak, shkiinhzhik, nang, ge wiyaw mowndos-kow minwaa biiskonon mii dash ow chick ji biskjiigaabwid



Wshitoon nake gezhi aanjooyin costumes

- Instead of toggling between sprites to make the chick look like it’s eating, experiment with code to develop a way to create an animated sprite
- Insert a **forever** block from the **Events** category. Insert two **switch costume to** blocks in the space. In the value space of the first **switch costume to** block, select **chick-stand**. In the second, select **chick-eat**. Test the code.

To ensure the alternation between images is visible, slow down the animation

- Between the two **switch costume to** blocks, add a **wait** __ **seconds** block from the **Control** category. Leave the value space at the

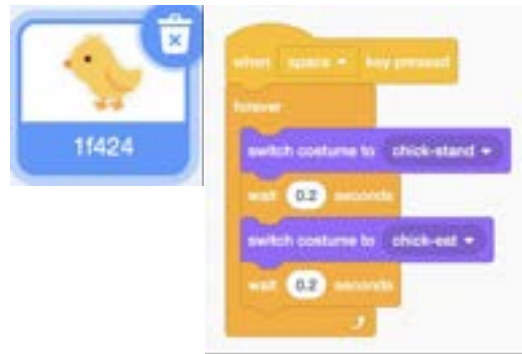
default value of 1. Test the code to see how this timing changes the animation. Now, add a **wait 1 seconds** block after the second **switch costume to** block

- Adjust the timing of the animation as desired by changing the values in the **wait** __ **seconds** blocks

Make the chick eat when a defined event happens

- Dagoonan iw event block odii **Events** category temgak. Gwejtoon naanind ji wiisnid ow chick

NB: *Nenim ekinomaagzijig ji wzhitoodwaad iw code minwaa ji aajiiim-demgak iw sprite move. Giishpin zinaagzid wiindowmow ji gnoonaad naanin ekinomaagzijig miigo ji weshtoonyeg iw code.*



Shkaasemgak

Pii gii shkwaakmigziyin daa shkitoon ji generate an animated sprite in Scratch. Gdi kendaan ji shkitooyin ji animate a sprite minwaa ji wiidmaageyin gaazhi wzhitoooyin. Wdi shkitoonaawaa ge ji aabjich-gaademgak iw Scratch aabitoon basic code to create animated sprites.

Ressources:

- **Scratch** (scratch.mit.edu)
- **Tutorial for Educators** (youtube.com/watch?v=4nfVirm1lkA)
- **Emoji: The Language of the Future** | Tracey Pickett | TEDxGreenville (TEDx Talks) (youtube.com/watch?v=Dzlek8nMrc8)
- **The History of Emoji** (Tofugu) (youtube.com/watch?v=SoZlB9pFV2M)
- **Inclusive and Accessible Emoji Practices for Our Increasingly Digital World** (feminuity.org/post/inclusive-and-accessible-emoji-practices-for-our-increasingly-digital-world)

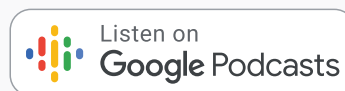
Mkaanjgaadeg pkaan entaagwak odii STEAM kinoomaagewin



Washme niibwaa iw zhibigaademgak, Iw gyak *Root & STEM* ezhitood ge aabjitooyin ji noondman minwa nake ge zhitooyin minwaa e aabjijichgaademgak odii STEAM kinoomaagewnon.



Bzhindaan odii Spotify



Bzhindaan omaa Google zhichgaadeg



Bzhindaan omaa Apple zhichgaadeg

rootandstem.ca/learn/the-root-stem-podcast

Gdaa minendaan na gi maadaadooyin iw *Root & STEM* ezhnikaadeg?
Maadaadooyin iw Ampere omaa Facebook ge Instagram gdaa wiindaamaage enendman iw gaa zhichgaadeggak aabjittoyin iw hashtag #RootandSTEMPod.