

AUTOMATA: HMOOB KEEB KWM XIB FWB QHIA 2022 / 3 - 5 XYOO

Qhov project no yog tsim los koom nrog cov tub ntxhais hluas hauv engineering kev ua ub no uas sawv cev rau cov cuab yeej cuab tam kev cai ntawm txhua tus tswv cuab ntawm lawv cov entourage. Lub hom phiaj ntawm txoj haujlwm no yog los txhawb kev txhawb nqa los ntawm kev sau ntawv tus kheej ntau ntxiv.

KEV SIB TXUAS LUS

Xyoo no, peb qhov project tsum mus rau ob zaj dab neeg Hmoob, "Vim li cas cov neeg ua liaj ua teb thauj qoob loo" thiab "Lub hnuab thiab lub hli". Cov yeeb yaj kiab hais txog cov dab neeg no yuav tshaj tawm los ntawm tus neeg hais dab neeg Brian Xiong ua lus Askiv thiab lus Hmoob thiab embellished nrog animated dluab tsim los ntawm tej hauj lwm ntawm kos duab los ntawm Yinkong Vue.

LINK BETWEEN SCIENCE THIAB ENGINEERING

Kev ua haujlwm engineering yog nyob ib puag ncig ntawm kev tsim cov autopilot piav qhia txog qhov xwm txheej ntawm ib qho ntawm Mayan dab neeg. Automata yog cov cuab yeej siv tshuab uas ua haujlwm siv lub log, qag, levers, thiab lwm yam khoom siv yooj yim uas txav ib qho khoom. Cov tub ntxhais kawm yuav txhim kho lawv cov txuj ci los ntawm kev tsim thiab daws teeb meem thaum ua tiav ntau lub voj voog ntawm Engineering Design Process.

ENGINEERING PHEM

Los ntawm kev tsim engineering games, peb lub hom phiaj yog qhov tseeb los koom nrog cov tub ntxhais kawm hauv txoj kev txhim kho, kev tsim kho thiab pab lawv daws teeb meem. Cov khoom kawg tsis yog qhov tseem ceeb raws li kev txhim kho ntawm kev ntseeg tus kheej thiab kev kawm txuj ci uas cov tub ntxhais kawm tsim thooob plays hauv cov Engineering Design Process.



Parallel mobility
ntaus ntawv
Nrog 4 bar txuas



Cam thiab cam
follower Ntaus

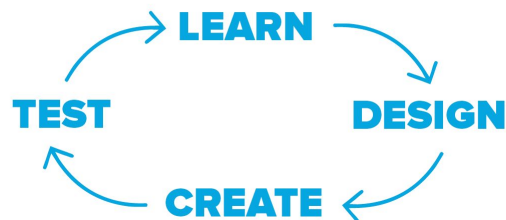


Ntaus nrog pendulum thiab
lever txav

LUB SIJ HAWM TXOJ CAI TSHIAB

Ntawm no yog ib qho piv txwv ntawm lub voj voog engineering - ib txoj kev xav txog yuav ua li cas engineers yuav daws teeb meem. Tus engineer yuav tsum pib los ntawm kev tshawb pom qhov teeb meem, tsim kev daws teeb meem, tsim khoom, thiab tom qab ntawd sim. Tom qab ntawd nws yuav kawm ntau yam los ntawm kev ua cov kev xeeb thiab tuaj yeem hloov kho nws qhov kev teeb tsa, uas txhais tau tias yuav tsum tau pib lub voj voog rov qab mus txog thaum kawg!

Thoob plaws hauv lub voj voog no, cov neeg koom nrog yuav tsis pom qhov xav tau los nug ntau cov lus nug, qhia lawv cov tswv yim thiab koom nrog lawv cov dag zog. Cov kws ua haujlwm ib txwm sim lawv txoj hmoo, vim tias muaj kev nyuaj thiab tsis ua haujlwm yog ib feem tseem ceeb ntawm cov txheej txheem.



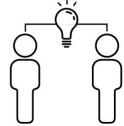
ASK QUESTIONS



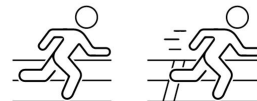
SHARE IDEAS



WORK TOGETHER



KEEP TRYING



Cov lus nug los txhawb cov tub ntxhais kawm xav txog Engineers

- Thaum lub ntsuas tsis ua haujlwm li qub
 - Koj cov cuab yeej puas ua haujlwm txawv dua li qhov koj xav tau? Yog tias muaj, peb kawm tau dab tsi los ntawm qhov kev zoo siab no?
 - Cov kauj ruam twg ntawm koj lub cuab yeej tsis mus raws li koj xav tau? Kuv yuav ua li cas hloov cov khoom no yam tsis tas yuav pib dua?
 - Puas muaj tej yam khoom uas koj tsis tau hais txog tej zaum yuav pab daws tau tej teeb meem?
- Thaum ib yam khoom ua haujlwm raws li qhov xav tau
 - Piav cov txheej txheem ntawm kev ua haujlwm.
 - Dab tsi ntawm koj txoj kev npaj tswv yim koj xav tias ua haujlwm zoo thawj zaug? Dab tsi ntawm koj txoj kev npaj ua tiav koj yuav tsum tau hloov pauv?
 - Koj tuaj yeem ua dab tsi ntxiv? Dab tsi ntawm koj txoj kev npaj tsim koj yuav tsum tau hloov pauv kom ntsuas koj lub cuab yeej?
 - Puas muaj tej yam uas koj tseem tsis tau siv uas koj tuaj yeem sim nrog? Dab tsi ntxiv nta? Cov ntaub ntawv twg kuv tuaj yeem hloov tau?
 - Puas muaj cov khoom sib txawv koj xav ua khoom siv tes ua uas yuav siv tib txoj haujlwm? Cov khoom siv no yog dab tsi? Nws yuav ua li cas?

EDUCATIONAL LUB HOM PHIAJ

- Cov neeg hauv Minnesota txhua tus muaj lawv tus kheej zaj dab neeg hais txog pej xeeb cov dab neeg thiab lawv txoj hauv kev los sau thiab tshaj tawm lawv cov kev tshawb pom.
- Science thiab engineering thov rau tib neeg los ntawm ntau haiv neeg thiab kev ntseeg.
- Engineering yog ib lub tswv yim uas cuam tshuam nrog kev ua yuam kev ntau, tom qab ntawd kawm lawv, thiab rov sim dua.

VAJTSWV

Automaton - cov cuab yeej siv tshuab uas siv ob lub log, qag, levers thiab ntau lwm cov tshuab yooj yim ua ib yam dab tsi txav.

Qag: pas nrig lossis ntsuas uas dhau los ntawm lub tsev ntawm lub log lossis lub cam

Cam: Phaj lossis lub log ntawm lub qag hloov lub zog hauv lub voj voog mus rau lub cam nrhiav cov cuab yeej uas txav nce thiab nqis

Cam follower: ib feem ntawm lub roob uas txav rov qab mus rau hauv kev sib cuag nrog lub cam pivoting ntawm lub axis

Zog: muaj peev xwm ua haujlwm; lub zog ua rau tej yam tshwm sim

Movement: hloov qhov chaw nyob rau hauv kev sib raug zoo rau ib qho chaw los yog ib yam khoom

Kev qab yuam: thawb lossis kev nyiam uas ua rau taw tes lossis hloov txoj haujlwm

Lever: lub tshuab zoo tib yam suav nrog lub bar lossis phaj uas tig ib ncig ntawm qhov chaw ruaj khov, lossis kev sib txuas lus

Pivot: Kev sib hloov, qaij, lossis rov qab mus rau pem hauv ntej

Fulcrum: point of rotation los yog balance of a lever

Mechanism: cov cuab yeej siv los hloov lossis tswj kev khiav lossis hloov lub zog hauv lub tshuab

Txuas Nrog Standard

2019 MN Cov Qauv Kev Tshawb Fawb: 3.2.2 Cov tub ntxhais kawm muaj peev xwm siv tau lawv txoj kev txhais cov ntsiab lus ntawm kev tshawb fawb thiab cov qauv engineering los tsim cov kev daws teeb meem uas ua tau raws li cov qauv tsim thiab cov kev xav tau. 4E.3.2.2.1 5P.3.2.2.1

2019 MN Cov Qauv Kev Tshawb Fawb: 4.2.2 Cov tub ntxhais kawm yuav tsum tuaj yeem sau cov ntaub ntawv hais txog cov txheej txheem siv los ntawm ntau haiv neeg, nrog rau kev saib xyuas tshwj xeeb rau cov neeg Native American cov chaw nyob thiab cov zej zog hauv Minnesota, txhawm rau txheeb xyuas qhov tshwm sim thiab nrhiav teeb meem. 3E.4.2.2.1 4E.4.2.2.1

Minnesota Social Science Cov Qauv Draft 12/2020: 17.Tshawb nrhiav cov qauv kev xav, txoj hauv kev paub (kev coj noj coj ua) thiab txoj hauv kev ua (tus kheej) ntawm qhov chaw los ntawm ntau qhov kev xav, suav nrog cov neeg sawv cev ntawm cov neeg hauv paus txawm.

MN ELA Cov Qauv Ntawv Sau Ntawv: 3.1.2.2 Qhia dab neeg, nrog rau cov dab neeg, cov dab neeg ua si thiab dab neeg los ntawm ntau haiv neeg; tshawb nrhiav cov ntsiab lus tseem ceeb, zaj lus qhia lossis kev coj ncaj ncees thiab npaj nws txoj kev xa mus rau cov ntsiab lus tseem ceeb ntawm cov ntawv nyeem.

MN ELA Cov Qauv Ntawv Sau Ntawv: 4.1.3.3 Piav qhia tob txog tus neeg ua haujlwm, teeb tsa lossis lub ntsiab lus ntawm zaj dab neeg lossis kev ua si, hais txog cov ntsiab lus tshwj xeeb hauv cov ntawv nyeem.

MN ELA Cov Qauv Ntawv Sau Ntawv: 4.1.7.7 Ua kom muaj kev sib txuas ntawm cov ntawv ntawm ib zaj dab neeg lossis zaj yeeb yaj kiab thiab nthuav tawm qhov muag lossis qhov ncauj ntawm cov ntawv, txheeb xyuas qhov kev nthuav qhia no tsom rau cov lus piav qhia tshwj xeeb thiab cov lus qhia hauv cov ntawv nyeem.

MN ELA Hais lus, saib, mloog thiab nkag siab cov xov xwm: 3.8.2.2 Txiaiv txim siab cov tswv yim loj thiab txhawb cov ntsiab lus los ntawm cov ntawv nyeem nrov lossis cov ntaub ntawv muab los ntawm ntau yam kev tshaj tawm thiab cov qauv, suav nrog kev pom, ntau, thiab qhov ncauj.

Cov qauv kev tshawb fawb tiam tom ntej

Lub tswv yim tseem ceeb ntawm kev qhuab qhia: Txhais thiab piav qhia txog cov kev xav tau ntawm engineering (3-5-ETS1.A), txhim kho qhov muaj peev xwm daws tau (3-5-ETS1.B), txhim kho txoj kev tsim qauv (3-5-ETS1.C).

Kev Kho Mob thiab Kev Ua Haujlwm Engineering: Nug cov lus nug thiab txhais cov teeb meem (3-5-ETS1-1); npaj thiab ua kev tshawb xyuas (3-5-ETS1-2); tsim kev txhais lus thiab tsim kev daws teeb meem (3-5-ETS1-3).

General tswvyim: Kev cuam tshuam ntawm engineering, technology thiab science ntawm kev sib raug zoo thiab lub ntiaj teb ntuj tsim (3-5-ETS1-1) (3-5-ETS1-2)

LUSSON FACILITATION

Cov neeg siv muaj peev xwm hais hauv qab no los koj cov tub ntxhais kawm:

Cov ntaub ntawv

- Phau Ntawv Qhia Nyeem Ntawv - muaj cov duab kos ntawm cov cuab yeej siv thiab piav qhia txog qhov teeb meem ntawm lub cev tom qab qhov ntwis ntawm txhua tus
- Dab neeg kos duab
- Cov ntawv keeb kwm

Cov peev txheej online

- Cooperative Padlet lub vev xaib los qhia automatons tsim thiab pom kev ua haujlwm ntawm cov chav kawm los ntawm lwm lub tsev kawm ntawv
- Animation video Kuv "My First Tejido"
- Video ntawm zaj dab neeg animated "La Chatona"
- Pendulum Motion Lub cev muaj zog Video
- Cam thiab Cam taug qab Mechanisms Video
- Cov yeeb yaj kiab ntawm kev ua haujlwm ntawm tus tswj kev tawm suab thiab 4-bar kev sib txuas
- Cov ntaub ntawv Video
- PDF ntawm cov ntaub ntawv luam tawm (cov duab kos, phau ntawv qhia tub ntxhais kawm, phau ntawv qhia nyeem, zaj dab neeg)

TXOJ KEV POSSIBLE NTAWM TECHING

- Kev npaj rau zaj lus qhia - Cov neeg sau ntawv ntawm qhov project no, uas tau ua tiav nws xyoo dhau los, xav tau cov piv txwv ntawm cov khoom sib txawv los tsim ua ntej thawj zaj lus qhia. Ntau tus tub ntxhais kawm nyiam tuaj yeem kov cov cuab yeej thiab txawm pom lawv los ntawm ntau lub kaum ntse.
- Zaj Lus Qhia 1 - automaton yog dab tsi? Tshawb xyuas qhov sib txawv ntawm cov khoom siv thiab cov khoom siv ntawm cov khoom siv.
- Zaj Lus Qhia 2 - Zaj 1 - Vim li cas tus kws kos duab xaiv cov khoom thiab cov duab los sawv cev zaj dab neeg?
- Zaj Lus Qhia 3 - Zaj 2 - Vim li cas tus kws kos duab xaiv cov khoom thiab cov duab los sawv cev zaj dab neeg?
- Zaj Lus Qhia 4 - Npaj thiab pib tsim cov ntaub ntawv dab neeg.
- Zaj Lus Qhia 5 - Kev tsim kho ntxiv, kev sim thiab txhim kho cov cuab yeej.
- Zaj Lus Qhia 6 - Sib qhia ua hauj lwm hauv chav kawm.

Qhov kev vam meej no tsuas yog ib qho kev tawm tswv yim xwb. Txuas ntxiv lossis sib sau ua ke cov lus qhia thiab lwm yam dej num kom tau raws li qhov xav tau ntawm cov tub ntxhais kawm thiab cov neeg koom nrog.

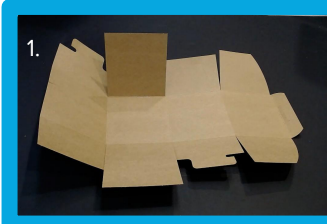
SAIB

- Cardboard Automata. (2021, Lub Ob Hlis 4). Tshawb nrhiav. <https://www.exploratorium.edu/tinkering/projects/cardboard-automata>
- "Pecking Hen Folk Toy To Make" from CuriosityShow <https://youtu.be/nGYqcGjVU1s>
- "How To Make Pecking Rooster Toy" from Learning World <https://youtu.be/RnShybishG8>
- "Force & Motion 2-3: MechAnimations" by G. Benenson & J. Neujahr, City Technology, City College of NY <https://www.citytechnology.org/docs/MechAnimations%20aug%2009.pdf>

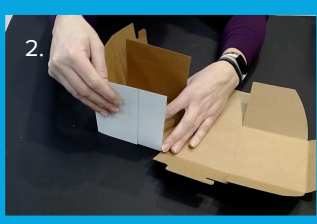
QHOV CHAW UA HAUJ LWM THIAB KEV PAB CUAM

CAUM THIAB ROLLER BOX ASSEMBLY

1. Quav lub thawv ntawm qhov siab ntawm txhua kab fold kom yooj yim.



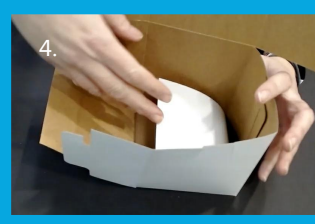
2. Quav qhov me sab flaps.



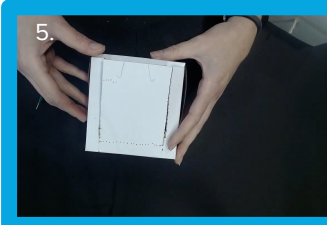
3. Tuav cov notches rau hauv cov slots.



4. Lub cam qag yuav dhau los ntawm sab flaps.



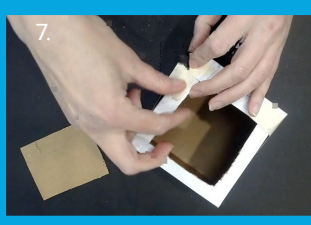
5. Lub hau sawv cev rau sab sauv.Kos qhov sib txawv ntawm ib sab yam tsis muaj lub ntsej muag.



6. Txiav tawm qhov qhib.



7. Siv daim npog ntsej muag kom txhawb nqa.



8. Ua ib qho qhib rau sab ntawm lub hauv siab rov qab.

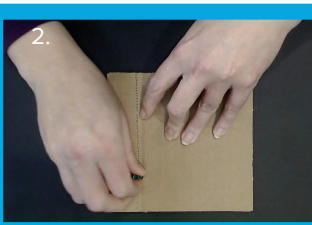


TXOJ HAUJ LWM CARDBOARD QHOV CHAW UA HAUJ LWM

1. Ntsuas thiab kos ib kab sib npaug rau corrugation.



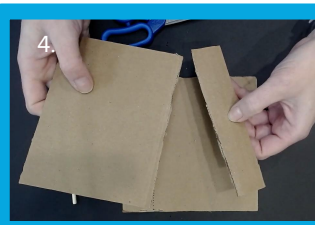
2. Siv ib tug dowel, ua ib txoj kab ntawm cov drillings ze.



3. Siv txiab txiav tawm qhov sib txawv rau tus pin kev ruaj ntseg.

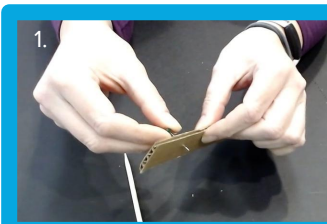


4. Txuas ntxiv ua kev ntsuas thiab qhov ntau thiab tsawg raws li xav tau.

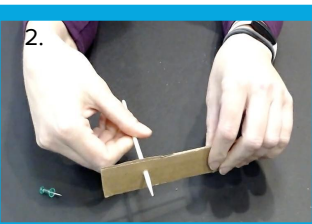


PUSH PIN THIAB SKEWER HOLE

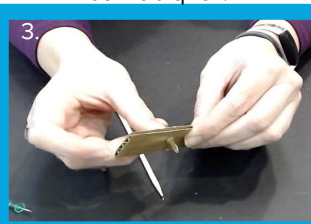
1. Siv tus thumbtack los tsim ib lub qhov pib.



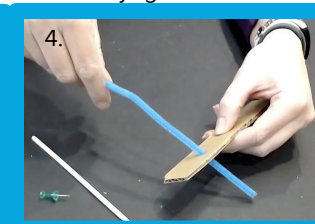
2. Thawb lub steel skewer rau hauv lub qhov.



3. Co lub skewer nyob rau hauv ib lub voj voog kom dav lub qhov.



4. Kuaj seb qhov taw tes loj txaus; ua kom nws loj dua yog tias xav tau.



COV NTAUB NTAWV ARTIST

Yinkong Vue

Midwest raws li illustrator thiab designer Yinkong Vue. Nws yog thawj tus tswv cuab ntawm nws tsev neeg tau yug los hauv Tebchaws Meskas; nws niam nws txiv thiab niam tais yawm txiv tau khiav tawm teb chaws Nyab Laj kom nyab xeeb thiab thaum kawg tau nyob hauv California. Nws BFA yog nyob rau hauv animation, uas nws kawm nyob rau hauv Minneapolis College of Art thiab Design. Ntxiv nrog rau nws txoj kev paub ntau xyoo hauv kev lag luam kev ua si, nws kuj muaj ntau xyoo dhau los ua tus kws kos duab ywj pheej. Nws tus kheej ua haujlwm yog suav nrog cov duab kos duab zoo nkauj uas yog lub hauv paus rau kev txhim kho cov cwj pwm zoo nkauj thiab tshawb nrhiav cov lus piav qhia uas cuam tshuam los ntawm cov dab neeg, keeb kwm, thiab kev paub txog ntawm cov neeg Hmoob thiab cov neeg Hmoob nyob hauv Teb Chaws Asmeskas. Txhawm rau txhawb nqa nws tus kheej, Yinkong tam sim no ua haujlwm ntawm ob peb sab haujlwm ntawm nws tus kheej lub sijhawm.

Brian Xiong

Brian V. Xiong kawm lus Hmoob, nws tab tom nrhiav ib tug kws tshaj lij hauv kev kawm txuj ci thiab cov tub ntxhais kawm thiab ntau haiv neeg hauv tsev kawm ntawv qib siab. Nws txoj kev tshawb fawb nthuav dav ntau yam kev qhuab qhia thiab kev qhuab qhia ntau yam, suav nrog kev tshawb fawb txog haiv neeg, haiv neeg, thiab ntau haiv neeg, kev tshawb fawb txog poj niam txiv neej thiab poj niam txiv neej, kev tshawb fawb African American, thiab tseem ceeb rau Hmoob, tus kws pab tswv yim, thiab cov neeg ua haujlwm kawm cov tub ntxhais kawm, collegiate thiab multicultural affairs, thiab ntau haiv neeg, suav nrog thiab kev ncaj ncees hauv kev kawm qib siab. Nws tau ua Tus Pab Koom Tes, Wallin Fellow, Cornwell Fellow, Sustainability thiab Equity Fellow, thiab sau.

Mekala Nava

Mekala Nava yog Nahua/Yaqui illustrator tab tom nrhiav kev sib cuag tshiab thiab txaus siab los ntawm kev kos duab ntawm zaj dab neeg. Nws nyiam koom nrog cov dab neeg, dab neeg, dab neeg thiab keeb kwm hauv nws txoj haujlwm thiab npaj siab nkag mus rau hauv lub ntiaj teb ntawm comics. Mekala kawm tiav los ntawm Cornish College of arts hauv kev sib txuas lus pom kev, nrog rau kev nyiam rau kev ua yeeb yam thiab kev txav. Nws nyiam kawm txog tib neeg ntawm kev ua tau zoo thiab nws tau txhawb thiab txuas rau tib neeg li cas hauv keeb kwm - yav dhau los, tam sim no thiab yav tom ntej.