

ព្រះរាជាណាចក្រកម្ពុជា  
ជាតិ សាសនា ព្រះមហាក្សត្រ



**វិទ្យាស្ថានគរុកោសល្យរាជធានីភ្នំពេញ**



**កម្មវិធីសិក្សាលម្អិត**

**សម្រាប់បណ្តុះបណ្តាលគ្រូបង្រៀនកម្រិតមធ្យមសិក្សា**

**ថ្នាក់បរិញ្ញាបត្រអប់រំ វិជ្ជាជីវៈគ្រូបង្រៀន (១២+៤)**

**ឯកទេស៖ គណិតវិទ្យា**

**មុខវិជ្ជា៖ ការប្រើICTសម្រាប់ការបង្រៀននិងរៀន II**

**ឆ្នាំទី២**

**តុលា ២០២២**

# បុព្វកថា

ដើម្បីរួមចំណែកក្នុងការអនុវត្តយុទ្ធសាស្ត្រចតុកោណដំណាក់កាលទី៤របស់រាជរដ្ឋាភិបាលដែលបានកំណត់យកការអភិវឌ្ឍធនធានមនុស្សជាអាទិភាពទីមួយ ក្រសួងអប់រំ យុវជន និងកីឡាបានកសាងផែនការយុទ្ធសាស្ត្រវិស័យអប់រំឆ្នាំ២០១៩-២០២៣ ក្នុងគោលបំណងអភិវឌ្ឍមូលធនមនុស្សដើម្បីប្រែក្លាយកម្ពុជាទៅជាប្រទេសមានចំណូលមធ្យមកម្រិតខ្ពស់ក្នុងឆ្នាំ២០៣០ និងជាប្រទេសអភិវឌ្ឍន៍នៅឆ្នាំ២០៥០។ ដើម្បីឆ្លើយតបនឹងចក្ខុវិស័យនេះ ក្រសួងអប់រំ យុវជន និងកីឡា បាននឹងកំពុងយកចិត្តទុកដាក់យ៉ាងខ្លាំងក្នុងការលើកកម្ពស់គុណភាពអប់រំ ដើម្បីបង្កើនគុណភាពធនធានមនុស្សឱ្យស្របទៅនឹងសកលការបន្ថែមនៃការអប់រំនៅក្នុងតំបន់ និងលើសកលលោក តាមតម្រូវការទីផ្សារការងារក្នុងសង្គមពុទ្ធិនាសតវត្សរ៍ទី២១នេះ។ ទន្ទឹមគ្នានេះដែរ ក្រសួងអប់រំ យុវជន និងកីឡាបានកំណត់យកគ្រូបង្រៀនជាអាទិភាពទី១ក្នុងកំណែទម្រង់របស់ខ្លួនដែលមានចែងក្នុងមុំទី១ស្តីពី "ការពង្រឹងគុណភាពអប់រំ វិទ្យាសាស្ត្រ និងបច្ចេកវិទ្យា" ។

តាមស្មារតីនេះ ក្រសួងអប់រំ យុវជន និងកីឡាបានបង្កើនកម្រិតនៃការបណ្តុះបណ្តាលគ្រូបង្រៀនបឋមសិក្សា និងមធ្យមសិក្សាបឋមកម្រិតខ្ពស់កម្រិតបរិញ្ញាបត្រ (អប់រំ) តាមរយៈការបង្កើតវិទ្យាស្ថានគរុកោសល្យចំនួន២ គឺវិទ្យាស្ថានគរុកោសល្យរាជធានីភ្នំពេញ និងវិទ្យាស្ថានគរុកោសល្យបាត់ដំបង ក្នុងគោលបំណងបណ្តុះបណ្តាលគ្រូបង្រៀនប្រកបដោយគុណសម្បទាពេញលេញរួមមានវិជ្ជាសម្បទា បំណិនសម្បទា កាយសម្បទា និងចរិយាសម្បទា ស្របតាមស្តង់ដារអន្តរជាតិ។ កម្មវិធីសិក្សាលម្អិតនេះ ត្រូវបានអភិវឌ្ឍឡើងស្របតាមក្របខណ្ឌកម្មវិធីសិក្សារបស់វិទ្យាស្ថាន ដើម្បីធានានូវសង្គតិភាព និងគុណភាព ក្នុងការអនុវត្តកម្មវិធីបណ្តុះបណ្តាលគ្រូបង្រៀននេះឱ្យមានប្រសិទ្ធភាពខ្ពស់។

ក្រសួងអប់រំ យុវជន និងកីឡាជឿជាក់ថា កម្មវិធីសិក្សាលម្អិតនេះនឹងជាឯកសារសំខាន់ក្នុងការជួយគាំទ្រដល់ការអនុវត្តកម្មវិធីបណ្តុះបណ្តាលគ្រូបង្រៀនឱ្យមានគុណភាពខ្ពស់ប្រកបដោយចំណេះដឹង សមត្ថភាពជំនាញវិជ្ជាជីវៈ គុណធម៌ សីលធម៌ សុខភាពល្អ និងស្មារតីទទួលខុសត្រូវ ដើម្បីធានាបាននូវការអប់រំប្រកបដោយគុណភាពនិងប្រសិទ្ធភាព។ ក្រសួងអប់រំ យុវជន និងកីឡា សូមថ្លែងអំណរគុណដល់មន្ត្រីជំនាញគណៈកម្មការ អនុគណៈកម្មការ ក្រុមការងារ ដៃគូអភិវឌ្ឍវិស័យអប់រំ និងអ្នកពាក់ព័ន្ធទាំងអស់ដែលបានយកចិត្តទុកដាក់ក្នុងការរៀបចំឯកសារនេះ។

ថ្ងៃ ខែ ឆ្នាំជូត ទោស័ក ព.ស.២៥៦៤  
រាជធានីភ្នំពេញ ថ្ងៃទី ខែ ឆ្នាំ២០២០  
**រដ្ឋមន្ត្រីក្រសួងអប់រំ យុវជន និងកីឡា**



## **អារម្ភកថា**

កម្មវិធីសិក្សាលម្អិត ការប្រើ ICT សម្រាប់ការបង្រៀននិងរៀន សម្រាប់អប់រំគ្រូបង្រៀនកម្រិតមធ្យមសិក្សា ថ្នាក់បរិញ្ញាបត្រ (១២+៤) ឯកទេសគណិតវិទ្យាត្រូវបានរៀបចំឡើងដោយមន្ត្រីអប់រំរបស់ក្រសួងអប់រំ យុវជន និងកីឡាមកពី នាយកដ្ឋាននានាក្រោមឱវាទក្រសួង សាកលវិទ្យាល័យ វិទ្យាស្ថានជាតិអប់រំ រួមជាមួយដៃគូ អភិវឌ្ឍដូចជាអង្គការ JICA/E-TEC អង្គការVVOB និងផ្សេងទៀត។

ខ្លឹមសារនៅក្នុងកម្មវិធីសិក្សាលម្អិតនេះរួមមានកម្មវិធីសិក្សាលម្អិតសម្រាប់ឆ្នាំសិក្សាទី២ ដែលមានទាំង ចំណងជើងមេរៀន និងវិធីសាស្ត្របង្រៀនស្នើសម្រាប់អនុវត្តការបង្រៀន និងរៀនតាមសប្តាហ៍នីមួយៗ។ កម្មវិធី សិក្សានេះ គឺជាឯកសារដ៏សំខាន់របស់វិទ្យាស្ថានគរុកោសល្យ ដែលសាស្ត្រាចារ្យឧទ្ទេសអាចយកទៅប្រើប្រាស់ក្នុង កម្មវិធីបណ្តុះបណ្តាលគ្រូបង្រៀនប្រកបដោយប្រសិទ្ធភាព និងទទួលបានលទ្ធផលល្អ។

ក្រុមការងារយើងខ្ញុំសូមថ្លែងអំណរគុណចំពោះថ្នាក់ដឹកនាំក្រសួងអប់រំ យុវជន និងកីឡា ដែលបាន ជួយឧបត្ថម្ភ គាំទ្រក្នុងការអភិវឌ្ឍកម្មវិធីសិក្សាដ៏មានតម្លៃនេះ។ យើងខ្ញុំទាំងអស់គ្នា នឹងបន្តខិតខំកែលម្អ កម្មវិធីសិក្សានេះ បន្ថែមទៀត ដើម្បីឱ្យការអប់រំគ្រូបង្រៀននៅវិទ្យាស្ថានគរុកោសល្យ កាន់តែមានគុណភាព ប្រសើរឡើង។

**គណៈកម្មការមុខវិជ្ជា ICT**

# គណៈកម្មការរៀបចំ

## គណៈកម្មការគ្រប់គ្រង

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| ១. ឯ.ខ. បណ្ឌិតសភាចារ្យ ហង់ ជួន ណារ៉ុន រដ្ឋមន្ត្រីក្រសួងអប់រំ យុវជន និងកីឡា | ប្រធាន    |
| ២. ឯ.ខ. បណ្ឌិតសភាចារ្យ ណាត ប៊ុនរឿន រដ្ឋលេខាធិការក្រសួងអប់រំ យុវជន និងកីឡា  | អនុប្រធាន |
| ៣. ឯកឧត្តម ហ៊ាង ស៊ីណេ អនុរដ្ឋលេខាធិការក្រសួងអប់រំ យុវជន និងកីឡា            | សមាជិក    |
| ៤. ឯកឧត្តម លាង សេងហាក់ អនុរដ្ឋលេខាធិការក្រសួងអប់រំ យុវជន និងកីឡា           | សមាជិក    |
| ៥. ឯកឧត្តម ពុត សាមិត្ត អគ្គនាយកអប់រំ                                       | សមាជិក    |

## គណៈកម្មការបច្ចេកទេស

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| ១. ឯ.ខ. បណ្ឌិតសភាចារ្យ ណាត ប៊ុនរឿន រដ្ឋលេខាធិការក្រសួងអប់រំ យុវជន និងកីឡា      | ប្រធាន          |
| ២. ឯកឧត្តម ហ៊ាង ស៊ីណេ អនុរដ្ឋលេខាធិការក្រសួងអប់រំ យុវជន និងកីឡា                | អនុប្រធាន       |
| ៣. ឯកឧត្តម លាង សេងហាក់ អនុរដ្ឋលេខាធិការក្រសួងអប់រំ យុវជន និងកីឡា               | អនុប្រធាន       |
| ៤. ឯកឧត្តម ពុត សាមិត្ត អគ្គនាយកអប់រំ   | អនុប្រធាន       |
| ៥. ឯកឧត្តម អ៊ុក សិទ្ធិជាតិ អគ្គនាយកកីឡា  | សមាជិក          |
| ៦. ឯកឧត្តម ជេត ជាលី សាកលវិទ្យាធិការនៃសាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ               | សមាជិក          |
| ៧. ឯកឧត្តមបណ្ឌិត ឌី សមស៊ីជេត អគ្គនាយករងអប់រំ                                   | សមាជិក          |
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## Use of ICT in Teaching and Learning II

### I. General information

<b>Category</b>	Subject Knowledge
<b>Lecturer</b>	Name: ***** Email: *****
<b>Room</b>	Room *****, Building *****
<b>Student Teachers</b>	2 <sup>nd</sup> year of Lower Secondary Education Programme
<b>Semester</b>	Semester 1: 15 classes (2 hours ×15 weeks) Semester 2: 15 classes (2 hours ×15 weeks)
<b>Date</b>	November 2018 – August 2019
<b>Credits</b>	2(0-2)

### II. Module Description

This course provides an overview of the use of Information and Communication Technology (ICT) in teaching and focuses on a knowledge and understanding of ICT, learning how to use ICT to prepare lesson plans, making teaching and learning materials and working together, using the internet without violating copyrights. Student teachers will acquire knowledge and skills in basics of computer and internet literacy. Student teachers will possess competencies in using of ICT for communication, collaboration, collection and analysis of data for further study and research effectively. Also, Student teachers will understand the basic idea to teach their students how to use ICT.

### III. Module Objectives

After the study of this module, student teachers will be able:

- CLO 1: Identify resources, technology, and technology tools online used in teaching and learning (PLO2)
- CLO2: Use data through information and communication technology to support effective teaching and learning and professional ethics (PLO12)
- CLO3: Use information and communication technology tools to support teaching and learning in response to education in the digital age (PLO11)

### IV. Methodology

- Lecture
- Practice
- Group Discussion
- Individual Presentation

### V. Assessment (assignment, assessment criteria, hand-in date)

Preservice students will be evaluated comprehensively based on class attendance, contribution in class, report and performance in accordance with the assessment criteria.

No.	Assessment	Assessment criteria
1	Class attendance (10%)	More than 80 % of class attendance in each semester is prerequisite to submit assignments or to take examinations.
2	Contribution (20%)	Points to consider the class contribution: <ul style="list-style-type: none"><li>- To participate actively in group discussions.</li><li>- To express your own opinions in class.</li><li>- To hear earnestly the other students opinions in class.</li></ul>



3	Report/essay (30%)	<p><b>1<sup>st</sup> semester:</b> Theme: “Using Google Sheets, please create a student list with total score, average, rank, mention, and number of students by counting number of male and female in any class of a practical school. And then, send the link of the workbook to your lecturer.”</p> <ul style="list-style-type: none"> <li>- Date of hand-in by March 30th</li> <li>- The essay will be evaluated based on the Criteria for Evaluation Written Work in TEC.</li> </ul> <p><b>2<sup>nd</sup> semester:</b> Theme: “Please create a lesson plan for science subject by using OpenOffice.org writer, Adobe Photoshop, and store the result in Google drive after that share to lecturer with a presentation slide.”</p> <ul style="list-style-type: none"> <li>- Date of hand-in by August 30th</li> </ul> <p>The essay will be evaluated based on the Criteria for Evaluation Written Work in TEC.</p>
4	Performance (40%)	<p>The assessment will be made based on the criteria for evaluation in each midterm and final of each semester:</p> <ul style="list-style-type: none"> <li>- <u>Semester 1</u>: The midterm will occur during the 7<sup>th</sup> week of the 1<sup>st</sup> semester and the final examinations for the 1<sup>st</sup> semester will be made during the 15<sup>th</sup> week of the 1<sup>st</sup> semester.</li> <li>- <u>Semester 2</u>: The midterm will occur during the 7<sup>th</sup> week of the 2<sup>nd</sup> semester and the final examinations for the 2<sup>nd</sup> semester will be made during the 15<sup>th</sup> week of the 2<sup>nd</sup> semester.</li> </ul>

## VI. Other Course Specific Information

None

## VII. Reading List and Resources

- The 3rd Edition of Computer Education and Learning Booklet by the Ministry of Education, Youth and Sports
- Intel Teach start reading course, 2009 Edition
- Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport
- [https://wiki.openoffice.org/wiki/Documentation/OOo3\\_User\\_Guides/Calc\\_Guide/Page\\_breaks](https://wiki.openoffice.org/wiki/Documentation/OOo3_User_Guides/Calc_Guide/Page_breaks)
- <https://www.webucator.com/tutorial/advanced-microsoft-word/random-useful-items.cfm>
- <https://www.papercheck.com/open-office/create-a-table-of-contents-openoffice-3-2-1/>
- <https://www.webucator.com/tutorial/advanced-microsoft-word/working-with-long-documents.cfm>
- <https://wiki.openoffice.org/wiki/Math>
- [https://wiki.openoffice.org/wiki/Documentation/FAQ/Writer/FormattingText/How do I protect \(lock\) a section of text so that the content cannot be changed%3F](https://wiki.openoffice.org/wiki/Documentation/FAQ/Writer/FormattingText/How_do_I_protect_(lock)_a_section_of_text_so_that_the_content_cannot_be_changed%3F)
- [http://www.activitydata.org/How to Pivot data in Open Office Spreads.html](http://www.activitydata.org/How_to_Pivot_data_in_Open_Office_Spreads.html)
- [https://wiki.openoffice.org/wiki/Documentation/OOo3\\_User\\_Guides/Calc\\_Guide/Validating\\_cell\\_contents](https://wiki.openoffice.org/wiki/Documentation/OOo3_User_Guides/Calc_Guide/Validating_cell_contents)
- [https://wiki.openoffice.org/wiki/Documentation/OOo3\\_User\\_Guides/Calc\\_Guide/Autoformat and themes](https://wiki.openoffice.org/wiki/Documentation/OOo3_User_Guides/Calc_Guide/Autoformat_and_themes)
- <http://www.howtousevlookup.com/vlookup-in-openoffice/>
- <https://dottech.org/181240/how-to-use-hlookup-functions-in-openoffice-spreadsheets-tip/>
- <https://www.suse.com/c/brainstorm-cool-tip-protecting-spreadsheet-cells-openofficeorg-20-calc/https://www.google.com.kh/>
- <https://www.webucator.com/tutorial/advanced-microsoft-word/index.cfm>
- <https://www.computer-pdf.com/tutorials-photoshop-cs6>
- The Ministry of Education, Youth and Sport (MoEYS) published in 2016, grade 12 of ICT for textbooks and communication

- [The Grade 4 to Grade 6 Information and Communication Technology Details Study, published in 2018](#)
- [Other related resources:](#)
  - Textbook Ultimate computer repair guide 2010
  - [www.khmeros.info](http://www.khmeros.info); [www.openoffice.org](http://www.openoffice.org); [www.comptechdoc.org](http://www.comptechdoc.org);  
[www.techopedia.com/software](http://www.techopedia.com/software); [www.mybroadband.co.za](http://www.mybroadband.co.za); <http://krou.moeys.gov.kh>;  
<https://gsuite.google.com>; [www.eliademy.com](http://www.eliademy.com); [canvas.instructure.com](http://canvas.instructure.com); e-learning;  
[canvas.instructure.com](http://canvas.instructure.com); <http://classroom.google.com>; <http://cisco.netacad.net>

## VIII. Lesson Schedule in 2018-2019

### 1) Semester 1: Impress, Calc, and Google Apps:1 credit (2 hours × 15 weeks)

Week No.	Date	Topic
1-1	November	<b>OpenOffice.org Impress</b> Presentation Application and Object inserting to make a lesson presentation
1-2		Practice
2-1	November	Page formatting and animation for the lesson showing in class
2-2		Practice
3-1	December	Learn about each tab of the Slide Show view
3-2		Practice
4-1	December	<b>OpenOffice.org Calc</b> Use worksheets of data 1: Spreadsheets and datatype
4-2		Practice
5-1	December	Use worksheets of data 2: Page formatting, cell formatting, header and footer
5-2		Practice
6-1	January	Use worksheets of data 3: Operators and Date formatting
6-2		Practice
7-1	January	Use worksheets of data 4: Creating score table with built-in function
7-2		Practice
8-1	January	Use worksheets of data 5: If ()
8-2		Practice
9-1	January	Use worksheets of data 6: Sorting, Filtering, and printing
9-2		Practice
10-1	February	Use worksheets of data 7: OpenOffice.org calc Using Pivot Tables
10-2		Practice
11-1	February	Use worksheets of data 8: Using Data validation
11-2		Practice
12-1	February	Google Forms: Create a new form
12-2		Practice
13-1	February	Edit questions in form
13-2		Practice
14-1	March	Choose settings and preview your form
14-2		Practice
15-1	March	View and manage responses and print a form
15-2		Practice

### 2) Semester 2: Computational Thinking:1 credit (2 hours × 15 class hours)

Week No.	Date	Topic
1-1	April	Knowledge of Coding with Dance party
1-2		Practice
2-1	April	Programming with Angry Birds
2-2		Practice
3-1	May	Relay Programming
3-2		Practice

4-1	May	Debugging with Scrat
4-2		Practice
5-1	May	Collecting Treasure with Laurel
5-2		Practice
6-1	June	Creating Art with Code
6-2		Practice
7-1	June	Sticker Art with loops
7-2		Practice
8-1	June	Loops with Rey and BB-8
8-2		Practice
9-1	June	Conditionals in Minecraft: Voyage Aquatic
9-2		Practice
10-1	June	Until Loops in Maze
10-2		Practice
11-1	July	Harvesting with Conditionals
11-2		Practice
12-1	July	If/Else with Bee
12-2		Practice
13-1	July	For Loops with Bee
13-2		Practice
14-1	July	For Loops with Artist
14-2		Practice
15-1	August	Exploring Websites
15-2		Practice

## 1. Semester 1:1 credit (2 hours × 15 weeks)

### Week 1: Presentation Application and Object inserting to make a lesson presentation slide

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	Here, you learn how to use presentation application and understand the user interface. you will also be able to: <ul style="list-style-type: none"> <li>• describe the user interface.</li> <li>• understand slide pane, slide, and tool bar</li> <li>• insert text, picture, object, video, and sound</li> <li>• Practice</li> </ul>
4	<b>Learning Outcomes</b>	After completing work for this class, you will be able to: <ul style="list-style-type: none"> <li>• explain the benefit of using presentation application</li> <li>• describe the user interface</li> <li>• insert text, picture, object, video, and sound into the presentation slide</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• What is a presentation application used for?</li> <li>• What do we use the slide animation for?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>

### Week 2: Page formatting and animation for the lesson showing in class

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	Here, you learn how to format a presentation slide page. you will also be able to: <ul style="list-style-type: none"> <li>• format page</li> <li>• set object animation</li> <li>• Practice</li> </ul>
4	<b>Learning Outcomes</b>	After completing work for this class, you will be able to: <ul style="list-style-type: none"> <li>• format slide page correctly</li> <li>• set slide and object animation</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• Please describe how to format slide in presentation application.</li> <li>• Please tell how to set animation to object.</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>

### Week 3: Learn about each tab of the Slide Show view

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	Here, you learn how to create presentation slide by academic subject. you will also be able to: <ul style="list-style-type: none"> <li>• Know the function of each tab of the Slide Show view</li> <li>• Know how to print slide</li> <li>• Practice</li> </ul>
	<b>Learning Outcomes</b>	After completing work for this class, you will be able to: <ul style="list-style-type: none"> <li>• Know the how to use each tab of the Slide Show view</li> </ul>

		<ul style="list-style-type: none"> <li>• print presentation slide correctly</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• Please tell about the functions of each tab of the Slide Show view.</li> <li>• Please tell how to print presentation slide.</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>

#### Week 4: Use worksheets of data 1: Spreadsheets and datatype

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>Here, you learn how to use spreadsheet and understand the user interface. You will also be able to:</p> <ul style="list-style-type: none"> <li>• understand the benefit of using spreadsheet.</li> <li>• understand the user interface.</li> <li>• know what the column and row are.</li> <li>• datatype</li> <li>• Practice</li> </ul>
	<b>Learning Outcomes</b>	<p>After completing work for this class, you will be able to:</p> <ul style="list-style-type: none"> <li>• explain the benefit of using spreadsheet</li> <li>• explain the user interface of spreadsheet</li> <li>• tell the three worksheets of spreadsheet</li> <li>• tell about cell, cell address, and datatype in cell</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• What is a spreadsheet?</li> <li>• What are cell and cell address?</li> <li>• How many datatype in cell?</li> <li>• What are the benefits of spreadsheet for everyday life?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>

#### Week 5: Use worksheets of data 2: Page formatting, cell formatting, header and footer

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>Here, you learn how to format page setup, insert header and footer to worksheet, and format page. You will also be able to:</p> <ul style="list-style-type: none"> <li>• format page setup</li> <li>• insert header and footer to worksheet.</li> <li>• format cell.</li> <li>• Practice</li> </ul>
4	<b>Learning Outcomes</b>	<p>After completing work for this class, you will be able to:</p> <ul style="list-style-type: none"> <li>• know how to format page setup</li> <li>• understand how to insert header and footer</li> <li>• understand how to format cell</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• Why must we format page before working on spreadsheet?</li> <li>• Please tell how to insert header and footer in spreadsheet?</li> </ul>

6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>
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### Week 6: Use worksheets of data 3: Operators and Date formatting

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>Here, you learn how to format number, use operator (operator priority), and use of built-in function Today(), Now(), Month(), and Years(). You will also be able to:</p> <ul style="list-style-type: none"> <li>• Use operator(+, -, *, /, ...) and its' priority</li> <li>• Use built-in function such as Today(), Now(), Month(), and Years().</li> <li>• Practice</li> </ul>
4	<b>Learning Outcomes</b>	<p>After completing work for this class, you will be able to:</p> <ul style="list-style-type: none"> <li>• format number into other number formatting</li> <li>• change operator priority according to the need</li> <li>• use built-in function (Today(), Now(), Month(), and Years()) appropriately.</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• Please tell the priority of arithmetic operators(+, -, *, /).</li> <li>• Please tell function of Today(), Now(), Month(), and Years().</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>

### Week 7: Use worksheets of data 4: Creating score table with built-in function

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>Here, in order to create a list of data with built-in function in spreadsheet , you will be able to:</p> <ul style="list-style-type: none"> <li>• Learn some built-in function such as; Sum(), Average(), Rank(), Count() , CountA(), Countif(), and Countifs()</li> <li>• create student score list</li> <li>• Practice</li> </ul>
4	<b>Learning Outcomes</b>	<p>After completing work for this class, you will be able to understand how to use some built-in functions (Sum(), Average(), Rank(), Count() , CountA(), Countif(), and Countifs()) and you can create a student score list for your class administration process.</p>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• Please tell how to create a table in spreadsheet.</li> <li>• Please tell the difference between CountA() and Count()</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>

### Week 8: Use worksheets of data 5: If ()

1	<b>Date/time</b>	
2	<b>Venue</b>	



3	<b>Contents</b>	Here, you learn how to use built-in function “if()” and other comparable operation to calculate some problem with condition. You will able to: <ul style="list-style-type: none"> <li>• use compare operator (=, &gt;, &lt;, &lt;=, &gt;=, &lt;&gt;)</li> <li>• use function “if()”</li> <li>• create student score list (calculate mention and the result)</li> <li>• Practice</li> </ul>
4	<b>Learning Outcomes</b>	After completing work for this class, you will be able to: <ul style="list-style-type: none"> <li>• use the function “if()” correctly</li> <li>• calculate mention and students’ result</li> </ul>
5	<b>Main Questions</b>	• Please calculate mention of student?
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>

### Week 9: Use worksheets of data 6: Sorting, Filtering, and printing

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	Here, you learn how to sort, filter, and print data. You will able to: <ul style="list-style-type: none"> <li>• sort by name</li> <li>• sort by grade</li> <li>• filter data</li> <li>• print</li> <li>• Practice</li> </ul>
4	<b>Learning Outcomes</b>	After completing work for this class, you will be able to: <ul style="list-style-type: none"> <li>• sort student by name or grade</li> <li>• Find student by filtering</li> <li>• print the result list</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• What is the benefits sorting data in table ?</li> <li>• Why must we do data filter?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• The 3rd Edition of Computer Education for teaching and Learning Booklet, published in 2012 by the Ministry of Education, Youth and Sports</li> <li>• Department of Education, Youth and Sport, grade 11, published in 2016 by the Ministry of Education Youth and Sport</li> <li>• Intel Teach start reading course, 2009 Edition</li> </ul>

### Week 10: Using Pivot Tables

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	Here, you learn how to work with pivot tables. You will also be able to: <ul style="list-style-type: none"> <li>• Use pivot tables to analyze data</li> <li>• Edit pivot tables.</li> <li>• Format pivot tables.</li> <li>• practice</li> </ul>
4	<b>Learning Outcomes</b>	After completing work for this class, you will be able to: <ul style="list-style-type: none"> <li>• Use pivot tables to analyze data</li> <li>• Edit pivot tables.</li> <li>• Format pivot tables.</li> </ul>

5	<b>Main Questions</b>	• What is the importance of pivot tables in OpenOffice.org Calc?
6	<b>Reading List and Resources</b>	• <a href="http://www.activitydata.org/How to Pivot data in Open Office Spreads.html">http://www.activitydata.org/How to Pivot data in Open Office Spreads.html</a>

### Week 11: Data Validation

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	Here, you learn about Data validation. You will also be able to: <ul style="list-style-type: none"> <li>• Use data validation to limit data input</li> <li>• Show message with data restriction</li> <li>• Create dropdown list</li> <li>• Practice</li> </ul>
4	<b>Learning Outcomes</b>	After completing work for this class, you will be able to: <ul style="list-style-type: none"> <li>• Use data validation to limit data input</li> <li>• Show message with data restriction</li> <li>• Create dropdown list</li> </ul>
5	<b>Main Questions</b>	• What are the benefits of using data validation in spreadsheet ? • Please tell me how to create data validation to build a dropdown list.
6	<b>Reading List and Resources</b>	• <a href="https://wiki.openoffice.org/wiki/Documentation/OOo3_User_Guides/Calc_Guide/Validating_cell_contents">https://wiki.openoffice.org/wiki/Documentation/OOo3_User_Guides/Calc_Guide/Validating_cell_contents</a>

### Week 12: Create a new form

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	In this lesson, you will learn to: <ul style="list-style-type: none"> <li>• Create a new form</li> </ul> Add questions
4	<b>Learning Outcomes</b>	After completing this lesson, you will be able to: <ul style="list-style-type: none"> <li>• Know how to create a Form in Google Forms</li> </ul> Demonstrate how to add and choose questions in Google Forms
5	<b>Main Questions</b>	• How do you create a new form in Google Forms? • How do you add questions in Google Forms? How many question types are there in Google Forms?
6	<b>Reading List and Resources</b>	<a href="https://support.google.com/docs/answer/6281888?co=GENIE.Platform%3DDesktop&amp;hl=en">https://support.google.com/docs/answer/6281888?co=GENIE.Platform%3DDesktop&amp;hl=en</a> <a href="https://support.google.com/docs/answer/2839737">https://support.google.com/docs/answer/2839737</a>

### Week 13: Edit questions in form

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	In this lesson, you will learn to: <ul style="list-style-type: none"> <li>• Edit questions</li> <li>• Duplicate questions</li> <li>• Add image to questions</li> <li>• Add sections</li> <li>• Shuffle the question order</li> </ul> Set Response Validation

4	<b>Learning Outcomes</b>	After completing this lesson, you will be able to: <ul style="list-style-type: none"> <li>• Know how to edit questions in Google Forms</li> <li>• Explain how to add sections</li> <li>• Know how to shuffle question order</li> </ul> Demonstrate how to set Response Validation
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• Please tell how to edit questions</li> <li>• Please tell how to add sections</li> </ul> Please explain how to set Response Validation
6	<b>Reading List and Resources</b>	<a href="https://support.google.com/docs/answer/6281888?co=GENIE.Platform%3DDesktop&amp;hl=en">https://support.google.com/docs/answer/6281888?co=GENIE.Platform%3DDesktop&amp;hl=en</a> <a href="https://support.google.com/docs/answer/2839737">https://support.google.com/docs/answer/2839737</a> <a href="https://support.google.com/a/users/answer/9303071?hl=en&amp;ref_topic=9296604">https://support.google.com/a/users/answer/9303071?hl=en&amp;ref_topic=9296604</a>

### Week 14: Create and Grade Quizzes with Google Forms

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	In this lesson, you will learn to: <ul style="list-style-type: none"> <li>• Change the form settings</li> <li>• Preview your form</li> <li>• Send your form to responder</li> </ul> Start or stop response collection
4	<b>Learning Outcomes</b>	After completing this lesson, you will be able to: <ul style="list-style-type: none"> <li>• Understand Form Settings</li> <li>• Know how to send the form to the responder</li> </ul> Know how to start and stop response collection
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• Please tell how to choose settings and preview your form</li> </ul> Please tell how to send the form to the responder
6	<b>Reading List and Resources</b>	<a href="https://support.google.com/a/users/answer/9302966#2.1">https://support.google.com/a/users/answer/9302966#2.1</a> <a href="https://support.google.com/a/users/answer/9303072?hl=en&amp;ref_topic=9296604">https://support.google.com/a/users/answer/9303072?hl=en&amp;ref_topic=9296604</a> <a href="https://support.google.com/docs/answer/2839588">https://support.google.com/docs/answer/2839588</a>

### Week 15: Choose Where to Save Form Responses, delete a form or responses, and Print a Form

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	In this lesson, you will learn to: <ul style="list-style-type: none"> <li>• See responses in Forms</li> <li>• See responses in Sheets</li> <li>• Download responses as a CSV files</li> </ul> Print a form and responses
4	<b>Learning Outcomes</b>	After completing this lesson, you will be able to: <ul style="list-style-type: none"> <li>• Know how to see responses in Google Forms and Google Sheets</li> <li>• Know how to download responses as a CSV files</li> </ul> Know how to print a form and responses
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• How to download responses as a CSV files</li> </ul> How to start and stop response collection
6	<b>Reading List and Resources</b>	<a href="https://support.google.com/a/users/answer/9303167?hl=en&amp;ref_topic=9296604">https://support.google.com/a/users/answer/9303167?hl=en&amp;ref_topic=9296604</a> <a href="https://support.google.com/docs/answer/139706?hl=en&amp;ref_topic=6063592">https://support.google.com/docs/answer/139706?hl=en&amp;ref_topic=6063592</a> <a href="https://support.google.com/a/users/answer/9303073#5.1">https://support.google.com/a/users/answer/9303073#5.1</a>

**2. Semester 2: Computational Thinking I:1 credit (2 hours × 15 weeks)**

**Week 1: Knowledge of Coding with Dance party ( លោះដឹងអំពីការសរសេរកូដជាមួយការរាំ )**

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងប្រើគំនិតនៃការណែនាំម្តងហើយម្តងទៀតពី "Get Loopy" ដំណាក់កាលនេះនឹងឱ្យអ្នកប្រើរង្វិលជុំដើម្បីជួយឱ្យ BB-8 ឆ្លងកាត់ផ្លូវឯកស្របដែលមានប្រសិទ្ធភាពជាងមុន។</p> <p>Here, you will use the concept of repeating instructions from "Getting Loopy," this stage will have you using loops to help BB-8 traverse a maze more efficiently than before.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច:</p> <ul style="list-style-type: none"> <li>• កំណត់អត្ថប្រយោជន៍នៃការប្រើប្រាស់រចនាសម្ព័ន្ធរង្វិលជុំជំនួសឱ្យពាក្យដដែលៗ។ - Identify the benefits of using a loop structure instead of manual repetition.</li> <li>• បំបែកការណែនាំជាយូរមកហើយទៅជាលំដាប់ដែលអាចធ្វើម្តងទៀតធំបំផុត។ - Break down a long sequence of instructions into the largest repeatable sequence.</li> </ul> <p>ប្រើការបញ្ជូលគ្នានៃពាក្យបញ្ជាតាមលំដាប់លំដោយនិងរង្វិលជុំដើម្បីឈានដល់ចុងបញ្ចប់នៃផ្លូវឯកស្រប។ - Employ a combination of sequential and looped commands to reach the end of a maze.</p>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• តើរង្វិលជុំមានអ្វីខ្លះ? - What are loops?</li> <li>• ហេតុអ្វីយើងប្រើវា? - Why do we use them?</li> <li>• តើរង្វិលជុំធ្វើឱ្យកម្មវិធីរបស់អ្នកងាយស្រួលក្នុងការសរសេរយ៉ាងដូចម្តេច? - How did loops make your program easier to write?</li> <li>• គិតអំពីអ្វីមួយដែលធ្វើម្តងហើយម្តងទៀត។ តើកម្មវិធីនោះមើលទៅដូចម្តេច? - Think of something that repeats over and over again. What might the program for that look like?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher             <ul style="list-style-type: none"> <li>○ <a href="#">CSF Express Course 2018</a> - Website</li> <li>○ <a href="#">CS Fundamentals Main Activity Tips</a> - Lesson Recommendations</li> <li>○ <a href="#">Code.org</a> - Lesson Plan</li> </ul> </li> <li>• សម្រាប់គន្ធីសិស្ស - For students             <ul style="list-style-type: none"> <li>○ <a href="#">Unplugged Blockly Blocks (Grades 2 - 5)</a> - Manipulatives (<a href="#">download</a>)</li> <li>○ <a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

**Week 2: Programming with Angry Birds**

1	<b>Date/time</b>	
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2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងអភិវឌ្ឍជំនាញសរសេរកម្មវិធីនៅលើវេទិកាកុំព្យូទ័រដោយប្រើទ្រង់ទ្រាយប្លុកដែលជួយសិស្សឱ្យរៀនអំពីលំដាប់និងគំនិតនៃការសរសេរកម្មវិធីដោយមិនចាំបាច់ព្រួយបារម្ភអំពីវាក្យសម្ព័ន្ធដែលល្អឥតខ្ចោះ។</p> <p>Here, you will develop programming skills on a computer platform using a block-based format that helps students learn about sequence and concepts of programming, without having to worry about perfecting syntax.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច៖</p> <ul style="list-style-type: none"> <li>• បកប្រែចលនាទៅជាស៊េរីនៃពាក្យបញ្ជា - translate movements into a series of commands</li> </ul> <p>កំណត់និងរកឃើញកំហុសនៅក្នុងកម្មវិធីមួយ - Identify and locate bugs in a program</p>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• តើអ្វីទៅជាពាក្យបញ្ជាដែលប្រើសម្រាប់ការធ្វើចលនា? - What is the command that used for movements ?</li> <li>• តើអ្វីជាកំហុស? - What is the bug ?</li> </ul> <p>តើអ្នកសម្គាល់និងកំណត់ទីតាំងកំហុសនៅក្នុងកម្មវិធីយ៉ាងដូចម្តេច? - How do you identify and locate bugs in the program ?</p>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>○ <a href="#">Course A Online Puzzles 2018</a> - Website</li> <li>○ <a href="#">CS Fundamentals Main Activity Tips</a> - Lesson Recommendations</li> <li>○ <a href="#">Code.org - Lesson Plan</a></li> </ul> </li> <li>• សម្រាប់គន្ថនិស្សិត - For students <ul style="list-style-type: none"> <li>○ <a href="#">Compass Rose</a> - Handout</li> <li>○ <a href="#">Feeling Faces</a> - Emotion Images</li> <li>○ <a href="#">Unplugged Blockly Blocks (Grades K-1)</a> - Manipulatives</li> <li>○ <a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 3: Relay Programming

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងចាប់ផ្តើមជាមួយមេរៀនខ្លីមួយស្តីអំពីការបំបាត់កំហុសនិងការតស៊ូបន្ទាប់មកអ្នកនឹងផ្លាស់ប្តូរការប្រកួតប្រជែងទៅនឹងពេលវេលាភ្លាមៗនៅពេលសិស្សបំបែកក្រុមនិងធ្វើការជាមួយគ្នាដើម្បីសរសេរកម្មវិធីមួយការណែនាំមួយក្នុងពេលតែមួយ។</p> <p>Here, you will begin with a short lesson on debugging and persistence, then will quickly move to a race against the clock as students break into teams and work together to write a program one instruction at a time.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច៖</p>

		<ul style="list-style-type: none"> <li>កំណត់គំនិតដោយប្រើកូដនិងនិមិត្តសញ្ញា - Define ideas using code and symbols.</li> <li>ផ្ទៀងផ្ទាត់ការងារដែលធ្វើដោយមិត្តរួមក្រុម - Verify work done by teammates.</li> <li>សម្គាល់សញ្ញានៃការមិនសប្បាយចិត្ត - Identify signs of frustration</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>ចុះប្រសិនបើមនុស្សម្នាក់ៗនៅលើក្រុមមួយត្រូវបានអនុញ្ញាតឱ្យធ្វើប្រញាប់ប្រញាល់ក្នុងពេលតែមួយ? - What if each person on a team were allowed to do five arrows at a time? <ul style="list-style-type: none"> <li>តើវាសំខាន់យ៉ាងណាក្នុងការបំបាត់កំហុសរបស់យើងនិងការងាររបស់អ្នកសរសេរកម្មវិធីដទៃទៀតដែលធ្វើមុនយើង? - How important would it be to debug our own work and the work of the programmer before us?</li> <li>តើមានប្រញាប់ ១០ យ៉ាងដូចម្តេច? - How about with 10 arrows?</li> <li>១០.០០០? តើវាមានសារៈសំខាន់ច្រើនជាងឬតិចជាង? - 10,000? Would it be more or less important?</li> </ul> </li> <li>តើអ្នកគិតថាកម្មវិធីមួយល្អក្រោកជាងនេះនៅពេលមានមនុស្សច្រើនជាងម្នាក់បានធ្វើការលើវា? - Do you think a program is better or worse when more than one person has worked on it?</li> <li>តើអ្នកគិតថាមនុស្សនឹងមានកំហុសច្រើនរឺតិចនៅពេលពួកគេប្រញាប់? - Do you think people make more or fewer mistakes when they're in a hurry?</li> <li>If you find a mistake, do you have to throw out the entire program and start over?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li><a href="#">Relay Programming - Teacher Debugging</a> - Image</li> <li><a href="#">Relay Programming - Unplugged Video</a> (download)</li> <li><a href="#">Relay Programming - Teacher Video</a></li> <li><a href="#">Code.org - Lesson Plan</a></li> </ul> </li> <li>សម្រាប់គំរូនិស្សិត - For students <ul style="list-style-type: none"> <li><a href="#">Relay Programming Debugging Packet</a></li> <li><a href="#">Relay Programming Activity Packet</a> - Activity Packet</li> <li><a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

**Week 4: Debugging with Scrat**

1	<b>Date/time</b>	
2	<b>Venue</b>	



3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងជួបបញ្ហាដែលត្រូវបានដោះស្រាយមិនត្រឹមត្រូវ។ អ្នកនឹងត្រូវឆ្លងកាត់លេខកូដដែលមានស្រាប់ដើម្បីកំណត់កំហុសរួមទាំងរង្វិលជុំមិនត្រឹមត្រូវប្លុកដែលបាត់ប្លុកបន្ថែមនិងប្លុកដែលហួសសម័យ។</p> <p>Here, you will encounter puzzles that have been solved incorrectly. You will need to step through the existing code to identify errors, including incorrect loops, missing blocks, extra blocks, and blocks that are out of order.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច៖</p> <ul style="list-style-type: none"> <li>• ទស្សន៍ទាយកន្លែងដែលកម្មវិធីនឹងបរាជ័យ - Predict where a program will fail.</li> <li>• កែប្រែកម្មវិធីដែលមានស្រាប់ដើម្បីដោះស្រាយកំហុស - Modify an existing program to solve errors.</li> <li>• ឆ្លុះបញ្ចាំងពីដំណើរការបំបាត់កំហុសតាមរបៀបសមស្របតាមអាយុ - Reflect on the debugging process in an age-appropriate way.</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• តើអ្វីជាកំហុស? - What is the bug ?</li> <li>• តើអ្នកបានធ្វើអ្វីខ្លះដើម្បី "បំបាត់កំហុស" កម្មវិធី? - What did you do to "debug" the program?</li> <li>• តើអ្នកជួសជុលអ្វីមួយដែលមិនដំណើរការយ៉ាងដូចម្តេច? - How do you fix something that isn't working?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>◦ <a href="#">CS Fundamentals Main Activity Tips</a> - Lesson Recommendations</li> <li>◦ <a href="#">Code.org - Lesson Plan</a></li> </ul> </li> <li>• សម្រាប់គន្ធីសិស្ស - For students <ul style="list-style-type: none"> <li>◦ <a href="#">Debugging Recipe</a> - Student Handout</li> <li>◦ <a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 5: Collecting Treasure with Laurel

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងបន្តអភិវឌ្ឍការយល់ដឹងរបស់ពួកគេអំពីកូដដោះស្រាយនិងបំបាត់កំហុស។ ជាមួយនឹងចរិតថ្មី Laurel អ្នកជួបបញ្ហាដែលអ្នកនឹងបង្កើតកូដដោះស្រាយតាមលំដាប់លំដោយដើម្បីឱ្យឡូរ៉ាលប្រមូលយកកំណប់នៅពេលនាងដើរតាមផ្លូវ។</p> <p>Here, you will continue to develop their understanding of algorithms and debugging. With a new character, Laurel the Adventurer, you will create sequential algorithms to get Laurel to pick up treasure as she walks along a path.</p>
	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច៖</p> <ul style="list-style-type: none"> <li>• បញ្ជាទិញចលនាចលនាជាជំហានបន្តបន្ទាប់នៅក្នុងកម្មវិធី។ - Order movement commands as sequential steps in a program.</li> </ul>

		<ul style="list-style-type: none"> <li>តំណាងកូដដោះស្រាយជាកម្មវិធីកុំព្យូទ័រ - Represent an algorithm as a computer program.</li> </ul> <p>បង្កើតការដោះស្រាយបញ្ហានិងជំនាញក្នុងការត្រិះរិះពិចារណាដោយការពិនិត្យមើលការអនុវត្តកែកំហុស។ - Develop problem solving and critical thinking skills by reviewing debugging practices.</p>
5	<b>Main Questions</b>	តើយើងតំរៀបពាក្យបញ្ជាជាជំហានបន្តបន្ទាប់នៅក្នុងកម្មវិធីយ៉ាងដូចម្តេច? - How do we order the commands as sequential steps in a program ?
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li><a href="#">CSF Express Course 2018</a> - Website</li> <li><a href="#">CS Fundamentals Main Activity Tips</a> - Lesson Recommendations</li> <li><a href="#">Code.org</a> - Lesson Plan</li> </ul> </li> <li>សម្រាប់គនុសិស្សិត - For students <ul style="list-style-type: none"> <li><a href="#">Unplugged Blockly Blocks (Grades 2 - 5)</a> - Manipulatives (<a href="#">download</a>)</li> <li><a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 6: Creating Art with Code

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅក្នុងផ្នែកនេះអ្នកនឹងគ្រប់គ្រងសិល្បករដើម្បីបញ្ចប់គំនូរនៅលើអេក្រង់។ ដំណាក់កាលសិល្បករនេះនឹងអនុញ្ញាតឱ្យនិស្សិតបង្កើតរូបភាពនៃរាងស្មុគស្មាញកាន់តែខ្លាំងឡើងដោយប្រើប្រាស់កម្មវិធីដូចជាឆ្ពោះទៅមុខ ១០០ ភីកសែលហើយបត់ស្តាំ ៩០ ដឺក្រេ។</p> <p>In this section, you will take control of the Artist to complete drawings on the screen. This Artist stage will allow students to create images of increasing complexity using new blocks like move forward by 100 pixels and turn right by 90 degrees.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច:</p> <ul style="list-style-type: none"> <li>បង្កើតកម្មវិធីដើម្បីបំពេញរូបភាពដោយប្រើជំហានបន្តបន្ទាប់។ - Create a program to complete an image using sequential steps.</li> </ul> <p>បំបែករាងស្មុគស្មាញទៅជាផ្នែកសាមញ្ញៗ - Break complex shapes into simple parts.</p>
5	<b>Main Questions</b>	តើអ្នកបំបែករាងស្មុគស្មាញទៅជាផ្នែកសាមញ្ញយ៉ាងដូចម្តេច? - How do you break complex shapes into simple parts ?
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li><a href="#">CSF Express Course 2018</a> - Website</li> <li><a href="#">CS Fundamentals Main Activity Tips</a> - Lesson Recommendations</li> <li><a href="#">Code.org</a> - Lesson Plan</li> </ul> </li> <li>សម្រាប់គនុសិស្សិត - For students <ul style="list-style-type: none"> <li><a href="#">Artist Introduction</a> - Student Video</li> <li><a href="#">Turns &amp; Angles</a> - Student Video</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ <u>Turns &amp; Angles</u> - Student Handout</li> <li>○ <u>Think Spot Journal</u> - Reflection Journal</li> </ul>
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### Week 7: Sticker Art with loops

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅក្នុងមេរៀននេះរង្វិលជុំធ្វើឱ្យវាកាន់តែងាយស្រួលក្នុងការធ្វើឱ្យរូបភាពកាន់តែត្រជាក់ជាមួយសិល្បករ!។</p> <p>In this lesson, loops make it easy to make even cooler images with Artist!</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច:</p> <ul style="list-style-type: none"> <li>• កំណត់អត្ថប្រយោជន៍នៃការប្រើប្រាស់រចនាសម្ព័ន្ធរង្វិលជុំជំនួសឱ្យពាក្យដដែលៗ។ Identify the benefits of using a loop structure instead of manual repetition.</li> <li>• ខុសគ្នារវាងពាក្យបញ្ជាដែលត្រូវការធ្វើម្តងទៀតនៅក្នុងរង្វិលជុំនិងពាក្យបញ្ជាដែលគួរតែប្រើដោយខ្លួនឯង។ Differentiate between commands that need to be repeated in loops and commands that should be used on their own.</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• តើរង្វិលជុំគឺជាអ្វី? - What is the loop ?</li> </ul> <p>តើមានអ្វីទៀតដែលអ្នកអាចប្រើរង្វិលជុំសម្រាប់? - What else can you use a loop for?</p>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>○ Code Studio</li> <li>○ <u>Code.org - Lesson Plan</u></li> </ul> </li> <li>• សម្រាប់គន្ធីសិស្ស - For students <ul style="list-style-type: none"> <li>○ <u>Think Spot Journal</u> - Reflection Journal</li> </ul> </li> </ul>

### Week 8: Loops with Rey and BB-8

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងប្រើគំនិតនៃការណែនាំម្តងហើយម្តងទៀតពី "Get Loopy" ដំណាក់កាលនេះនឹងឱ្យអ្នកប្រើរង្វិលជុំដើម្បីជួយឱ្យ BB-8 ឆ្លងកាត់ផ្ទាំងគំនូរមួយដែលមានប្រសិទ្ធភាពជាងមុន។</p> <p>Here, you will use the concept of repeating instructions from "Getting Loopy," this stage will have you using loops to help BB-8 traverse a maze more efficiently than before.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច:</p> <ul style="list-style-type: none"> <li>• កំណត់អត្ថប្រយោជន៍នៃការប្រើប្រាស់រចនាសម្ព័ន្ធរង្វិលជុំជំនួសឱ្យពាក្យដដែលៗ។ - Identify the benefits of using a loop structure instead of manual repetition.</li> </ul>

		<ul style="list-style-type: none"> <li>• បំបែកការណែនាំជាយូរមកហើយទៅជាលំដាប់ដែលអាចធ្វើម្តងទៀតដំបំផុត។ - Break down a long sequence of instructions into the largest repeatable sequence.</li> </ul> <p>ប្រើការបញ្ជូនគ្នានៃពាក្យបញ្ជាតាមលំដាប់លំដោយនិងរង្វិលជុំដើម្បីឈានដល់ចុងបញ្ចប់នៃផ្លូវរាងគំនូរ។ - Employ a combination of sequential and looped commands to reach the end of a maze.</p>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• តើរង្វិលជុំមានអ្វីខ្លះ? - What are loops?</li> <li>• ហេតុអ្វីយើងប្រើវា? - Why do we use them?</li> <li>• តើរង្វិលជុំធ្វើឱ្យកម្មវិធីរបស់អ្នកងាយស្រួលក្នុងការសរសេរយ៉ាងដូចម្តេច? - How did loops make your program easier to write?</li> <li>• គិតអំពីអ្វីមួយដែលធ្វើម្តងហើយម្តងទៀត។ តើកម្មវិធីនោះមើលទៅដូចម្តេច? - Think of something that repeats over and over again. What might the program for that look like?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>○ <a href="#">CSF Express Course 2018</a> - Website</li> <li>○ <a href="#">CS Fundamentals Main Activity Tips</a> - Lesson Recommendations</li> <li>○ <a href="#">Code.org</a> - Lesson Plan</li> </ul> </li> <li>• សម្រាប់គនុសិស្ស - For students <ul style="list-style-type: none"> <li>○ <a href="#">Unplugged Blockly Blocks (Grades 2 - 5)</a> - Manipulatives (<a href="#">download</a>)</li> <li>○ <a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 9: Conditionals in Minecraft: Voyage Aquatic

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>សំណុំល្បែងផ្សំបនេះនឹងធ្វើការដើម្បីពង្រឹងនិងបង្កើតចំណេះដឹងអំពីរង្វិលជុំនិងណែនាំលក្ខខណ្ឌ។ តាមរយៈការភ្ជាប់គំនិតទាំងពីរនេះជាមួយគ្នាសិស្សនឹងអាចស្វែងយល់ពីសក្តានុពលនៃការបង្កើតកម្មវិធីរីករាយនិងច្នៃប្រឌិតនៅក្នុងបរិយាកាសថ្មីនិងរំភើប។</p> <p>This set of puzzles will work to solidify and build on the knowledge of loops, and introduce conditionals. By pairing these two concepts together, students will be able to explore the potential for creating fun and innovative programs in a new and exciting environment.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច:</p> <ul style="list-style-type: none"> <li>• កំណត់កាលៈទេសៈនៅពេលផ្នែកខ្លះនៃកម្មវិធីគួរដំណើរការហើយពេលណាមិនគួរ។ Define circumstances when certain parts of a program should run and when they shouldn't.</li> </ul>

		កំណត់ថាតើលក្ខខណ្ឌត្រូវបានបំពេញដោយផ្អែកលើលក្ខណៈវិនិច្ឆ័យដែរឬទេ? Determine whether a conditional is met based on criteria.
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• តើមានលក្ខខណ្ឌអ្វី? - What is conditional ?</li> <li>• តើអ្នកប្រើលក្ខខណ្ឌដោយរបៀបណា? - How did you use a conditional ?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>○ <a href="#">Code Studio</a></li> <li>○ <a href="#">Code.org - Lesson Plan</a></li> </ul> </li> <li>• សម្រាប់គំរូនិស្សិត - For students <ul style="list-style-type: none"> <li>○ <a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 10: Until Loops in Maze

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	នៅទីនេះអ្នកនឹងរៀនរហូតដល់រង្វិលជុំ។ អ្នកនឹងបង្កើតកម្មវិធីដែលមានសកម្មភាពសំខាន់ម្តងទៀតរហូតដល់ពួកគេឈានដល់ចំណុចឈប់ដែលចង់បាន។ Here, you will learn about until loops. You will build programs that have the main character repeat actions until they reach their desired stopping point.
4	<b>Learning Outcomes</b>	បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច៖ <ul style="list-style-type: none"> <li>• បង្កើតកម្មវិធីដោយការយល់ដឹងអំពីយុទ្ធសាស្ត្រជាច្រើនដើម្បីអនុវត្តលក្ខខណ្ឌ។ - Build programs with the understanding of multiple strategies to implement conditionals.</li> <li>• បកប្រែសេចក្តីថ្លែងតាមលក្ខខណ្ឌនិយាយភាសានិងរង្វិលជុំទៅជាកម្មវិធីមួយ។ - Translate spoken language conditional statements and loops into a program.</li> </ul>
5	<b>Main Questions</b>	តើមានអ្វីខុសគ្នារវាងរង្វិលជុំរហូតដល់រង្វិលជុំខណៈពេល? - What's the difference between an until loop and a while loop?
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>○ <a href="#">CSF Express Course 2018</a> - Website</li> <li>○ <a href="#">CS Fundamentals Main Activity Tips</a> - Lesson Recommendations</li> <li>○ <a href="#">Code.org</a> - Lesson Plan</li> </ul> </li> <li>• សម្រាប់គំរូនិស្សិត - For students <ul style="list-style-type: none"> <li>○ <a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 11: Harvesting with Conditionals

1	<b>Date/time</b>	
2	<b>Venue</b>	

3	<b>Contents</b>	<p>ការអនុវត្តការប្រើប្រាស់លក្ខខណ្ឌនៅក្នុងសេណារីយ៉ូផ្សេងៗគ្នាជួយអភិវឌ្ឍការយល់ដឹងរបស់សិស្សអំពីអ្វីដែលលក្ខខណ្ឌអាចធ្វើបាន។ នៅក្នុងមេរៀនមុនសិស្សគ្រាន់តែប្រើលក្ខខណ្ឌដើម្បីធ្វើចលនាជុំវិញរទេះ។ នៅក្នុងមេរៀននេះនិស្សិតនឹងប្រើលក្ខខណ្ឌដើម្បីជួយកសិករឱ្យដឹងថាពេលណាត្រូវប្រមូលផលដំណាំ។ លំនាំថ្មីនឹងលេចចេញហើយនិស្សិតនឹងប្រើគំនិតច្នៃប្រឌិតនិងការគិតឡើងវិញដើម្បីកំណត់លក្ខខណ្ឌដែលលេខកូដត្រូវបានដំណើរការនិងធ្វើម្តងទៀត។</p> <p>Practicing the use of conditionals in different scenarios helps to develop a student's understanding of what conditionals can do. In the previous lesson, students only used conditionals to move around a maze. In this lesson, students will use conditionals to help the farmer know when to harvest crops. New patterns will emerge and students will use creativity and logical thinking to determine the conditions where code should be run and repeated.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច៖</p> <ul style="list-style-type: none"> <li>• សុំនំលក្ខខណ្ឌដើម្បីវិភាគលក្ខខណ្ឌតម្លៃជាច្រើនដោយប្រើប្រសិនបើហេតុផលផ្សេង និងតតក្តីវិជ្ជាផ្សេងទៀត។ - Nest conditionals to analyze multiple value conditions using if, else if, else logic.</li> <li>• ភ្ជាប់រង្វិលជុំនិងសេចក្តីថ្លែងការណ៍ដែលមានលក្ខខណ្ឌជាមួយគ្នា។ - Pair a loop and conditional statement together.</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• តើមានលក្ខខណ្ឌអ្វី? - What is conditional ?</li> </ul> <p>តើអ្នកប្រើលក្ខខណ្ឌដោយរបៀបណា? - How did you use a conditional ?</p>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>○ <a href="#">Code Studio</a></li> <li>○ <a href="#">Code.org - Lesson Plan</a></li> </ul> </li> <li>• សម្រាប់គន្ថនិស្សិត - For students <ul style="list-style-type: none"> <li>○ <a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 12: If/Else with Bee

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងចាប់ផ្តើមសរសេរកូដដោយមានលក្ខខណ្ឌដែលអនុញ្ញាតឱ្យពួកគេសរសេរកូដដែលមានមុខងារខុសគ្នាអាស្រ័យលើលក្ខខណ្ឌជាក់លាក់ដែលកម្មវិធីជួប។</p> <p>Here, you will begin to code with conditionals, allowing them to write code that functions differently depending on the specific conditions the program encounters.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច៖</p> <ul style="list-style-type: none"> <li>• បកប្រែសេចក្តីថ្លែងការណ៍តាមភាសានិយាយទៅជាកម្មវិធី។ - Translate spoken language conditional statements into a program.</li> </ul>



		<ul style="list-style-type: none"> <li>ដោះស្រាយល្បែងផ្សំរូបដោយប្រើការរួមបញ្ចូលគ្នានៃរង្វង់លំដាប់និងលក្ខខណ្ឌ។ - Solve puzzles using a combination of looped sequences and conditionals.</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>តើសេចក្តីថ្លែងការណ៍មានលក្ខខណ្ឌគឺជាអ្វី? - What is a conditional statement?</li> <li>តើនៅពេលណាដែលមានលក្ខខណ្ឌមានប្រយោជន៍? - When is a conditional useful?</li> <li>តើលក្ខខណ្ឌអ្វីខ្លះដែលអ្នកបានប្រើក្នុងសកម្មភាពចុងក្រោយ? - What are some of the conditions you used in the last activity?</li> <li>តើមានលក្ខខណ្ឌអ្វីខ្លះទៀតដែលសត្វឃ្មុំអាចប្រើបាន? ឧទាហរណ៍រួមមាន៖ - What are some other conditionals a bee might use? Examples include: <ul style="list-style-type: none"> <li>ប្រសិនបើមានដើមឈើមួយនៅចំពោះមុខខ្ញុំការភ្ញាក់ផ្អើលចេញពីផ្លូវ។ - if there is a tree in front of me, buzz out of the way</li> <li>ប្រសិនបើស្លាបរបស់ខ្ញុំឈឺចាប់សូមសម្រាកនៅលើដី។ - if my wing is hurt, rest on the ground</li> </ul> </li> </ul> <p>ប្រសិនបើខ្ញុំឃើញសត្វឃ្មុំមួយទៀតនិយាយថា "ជំរាបសួរ!" - if I see another bee, say "Hello!"</p>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li><a href="#">CSF Express Course 2018</a> - Website</li> <li><a href="#">CS Fundamentals Main Activity Tips</a> - Lesson Recommendations</li> <li><a href="#">Code.org</a> - Lesson Plan</li> </ul> </li> <li>សម្រាប់គន្រិស្សិត - For students <ul style="list-style-type: none"> <li><a href="#">Unplugged Blockly Blocks (Grades 2 - 5)</a> - Manipulatives (<a href="#">download</a>)</li> <li><a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 13: For Loops with Bee

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងអនុវត្តការបង្កើតការរចនាគួរឱ្យចាប់អារម្មណ៍នៅក្នុងសិល្បករនិងការរុករកម៉ាសនៅឃ្មុំ។ អ្នកនឹងប្រើមុខងារដើម្បីប្រមូលផលដំណាំនៅក្នុងម៉ាស៊ីនប្រមូលផល។ មេរៀននេះនឹងជំរុញឱ្យអ្នកប្រើមុខងារតាមវិធីថ្មីដោយរួមបញ្ចូលជាមួយវាខណៈពេលរង្វង់លំដាប់និងប្រសិនបើ / ឬសេចក្តីថ្លែងផ្សេងទៀត។</p> <p>Here, you will practice creating impressive designs in Artist and navigating mazes in Bee. You will use functions to harvest crops in Harvester. This lesson will push you to use functions in new ways by combining them with while loops and if / else statements.</p>
4	<b>Learning Outcomes</b>	បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច:

		<ul style="list-style-type: none"> <li>កំណត់តម្លៃចាប់ផ្តើមបញ្ឈប់តម្លៃនិងបោះដំហានទៅមុខសម្រាប់ `for` loop. ។ - Determine starting value, stopping value, and stepping value for a `for` loop.</li> <li>ដឹងនៅពេលត្រូវប្រើប្រើប្រតិបត្តិការដដែលជាមួយ `for` និងពេលណាត្រូវប្រើប្រតិបត្តិការដដែល ផ្សេងទៀតដូចជា រង្វិលជុំ `repeat` និង `while` loops. ។ - Recognize when to use a `for` loop and when to use other loops such as `repeat` and `while` loops.</li> </ul>
5	<b>Main Questions</b>	តើមានអ្វីខុសគ្នារវាងរង្វិលជុំរហូតដល់រង្វិលជុំខណៈពេល? - What's the difference between an until loop and a while loop?
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li><a href="#">CSF Express Course</a> - Website</li> <li><a href="#">Code Studio</a></li> <li><a href="#">Code.org - Lesson Plan</a></li> </ul> </li> <li>សម្រាប់គន្លឹះសិស្ស - For students <ul style="list-style-type: none"> <li><a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 14: For Loops with Artist

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>ការច្នៃប្រឌិតនិងការត្រិះរិះពិចារណាមកជាមួយគ្នាយ៉ាងស្រស់ស្អាតនៅក្នុងមេរៀននេះ។ និស្សិតនឹងបន្តការអនុវត្តរបស់ពួកគេជាមួយ ប្រតិបត្តិការដដែលៗ និងអថេរខណៈពេលដែលពួកគេបង្កើតរូបភាពទម្លាក់ក្តាម។ មេរៀននេះជម្រុញឱ្យមានគំនិតច្នៃប្រឌិតខណៈពេលបង្រៀនគោលគំនិតសំខាន់ៗដល់វិទ្យាសាស្ត្រកុំព្យូទ័រ។</p> <p>Creativity and critical thinking come together beautifully in this lesson. Students will continue their practice with for loops and variables while they create jaw-dropping images. This lesson inspires a creative mind while teaching core concepts to computer science.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច:</p> <ul style="list-style-type: none"> <li>ប្រើប្រាស់ For loops ផ្លាស់ប្តូរ - Use `for` loops to change loop several times with different values.</li> <li>អាចដឹងពីរបៀបប្រើប្រាស់ for` loop និងនៅពេលណាត្រូវប្រើ `repeat` និង `while` loops.</li> </ul> <p>-Recognize when to use a `for` loop and when to use other loops such as `repeat` and `while` loops.</p>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>តើអ្វីជា <b>For Loops? What's a For loop?</b></li> </ul>

		តើមានអ្វីខុសគ្នារវាងរង្វិលជុំរហូតដល់រង្វិលដុំខណៈពេល? - What's the difference between an while loop and for a loop?
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>○ <a href="#">Code Studio</a></li> <li>○ <a href="#">Code.org - Lesson Plan</a></li> </ul> </li> <li>• សម្រាប់គន្ថនិស្សិត - For students <ul style="list-style-type: none"> <li>○ <a href="#">Think Spot Journal</a> - Reflection Journal</li> </ul> </li> </ul>

### Week 15: Exploring Websites

1	<b>Date/time</b>	
2	<b>Venue</b>	
3	<b>Contents</b>	<p>នៅទីនេះអ្នកនឹងចាប់ផ្តើមពិចារណាពីគោលបំណងដែលគេហទំព័រអាចបម្រើបាន ទាំងអ្នកប្រើប្រាស់និងអ្នកបង្កើត។ អ្នកនឹងស្វែងយល់ពីគេហទំព័រដែលប្រើច្រើនបំផុត នៅសហរដ្ឋអាមេរិកហើយព្យាយាមរកវិធីដែលគេហទំព័រនីមួយៗមានប្រយោជន៍ សម្រាប់អ្នកប្រើប្រាស់និងវិធីដែលពួកគេអាចបម្រើអ្នកបង្កើតផងដែរ។</p> <p>Here, you will start to consider the purposes a website might serve, both for the users and the creators. You will explore a handful of the most-used websites in the United States and try to figure out how each of those sites is useful for users and how they might also serve their creators.</p>
4	<b>Learning Outcomes</b>	<p>បន្ទាប់ពីបញ្ចប់ការងារសម្រាប់ថ្នាក់នេះអ្នកនឹងអាច៖</p> <ul style="list-style-type: none"> <li>• កំណត់មូលហេតុដែលនរណាម្នាក់អាចចូលមើលគេហទំព័រដែលបានផ្តល់ឱ្យ - Identify the reasons someone might visit a given website</li> <li>• កំណត់មូលហេតុដែលនរណាម្នាក់អាចបង្កើតវេបសាយដែលបានផ្តល់ឱ្យ។ - Identify the reasons someone might create a given website</li> </ul>
5	<b>Main Questions</b>	<ul style="list-style-type: none"> <li>• តើគេហទំព័រចុងក្រោយដែលអ្នកបានចូលទស្សនាគឺជាអ្វី? - What was the last website you visited?</li> <li>• ហេតុអ្វីបានជាអ្នកចូលទៅកាន់គេហទំព័រនោះ? - Why did you go to that website?</li> </ul>
6	<b>Reading List and Resources</b>	<ul style="list-style-type: none"> <li>• សម្រាប់គ្រូ - For teacher <ul style="list-style-type: none"> <li>○ <a href="#">The Purpose of Websites</a> - Exemplar</li> <li>○ <a href="#">Code.org - Lesson Plan</a></li> </ul> </li> <li>• សម្រាប់គន្ថនិស្សិត - For students <ul style="list-style-type: none"> <li>○ <a href="#">The Purpose of Websites</a> - Activity Guide</li> </ul> </li> </ul>