



# Coding

Grade 5 ADST Unit

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## Unit Overview

This is an introductory unit on coding for students. This unit will cover one of the Big Ideas from the British Columbia Curriculum for the subject of Applied Design, Skills, and Technologies with cross curricular objectives. Throughout this unit, students will gain knowledge on how to create a culturally responsive arcade game using coding. They will increase their understanding in project building through technology. They will develop skills in generating ideas, programming codes, and creating prototypes. This unit will use community Elder connections, thus make sure to follow the Elder check list when inviting an Elder or Knowledge Keeper to class. See [Appendix B](#). Culture and language are important objectives for First Nation, Inuit, and Metis; therefore, First Nation words in Northern Tutchone the Pelly Crossing and FT. Selkirk dialect will be introduced. These words can be adapted to local areas. This unit will take approximately six to eight weeks to complete. Some lessons may take more than one class to conclude.

### Prior Knowledge

Before commencing this unit, it would be beneficial for students to know and understand the following:

- Basic computer knowledge for example how to use a mouse to open and close programs.
- Basic knowledge of video games.
- Basic understanding of storyline traits.
- Basic understanding of the writing process; pre-writing, editing, and sharing.
- How to be respectful to Elders that are invited to class.

### First Peoples Principles of Learning

- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).
- Learning involves recognizing the consequences of one's actions.
- Learning involves patience and time.
- Learning requires exploration of one's identity.
- Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations.

### Essential Questions

- What makes a good arcade game?
- How has technology changed over time?
- How were First Nations people effected due to the advancement of technology?
- How has story telling changed over time; do you think technology has had a direct impact on story telling?
- Can coding be used to create a product that can be used to protect Culture and Language?
- How has technology changed the way traditional games are played?

## Essential Understandings

Students will understand:

- The quality, aspects, and criteria for what makes an engaging arcade game.
- The ways technology has changed in the past 100 years.
- How technology advancements impact the First Nations people.
- How technology has changed the way traditional stories are told.
- Ways that coding can be used to preserve First Nation culture and language.
- Changes in traditional games because of technology.

## Big Idea

Skills are developed through practice, effort, and action.

## Factual Knowledge

Students will know:

- Connection to the community through culture and social awareness.
- Literary elements like narrative structures and characterization.
- Features of an arcade game including characters, design, levels, music, and script.
- Program debugging methods to create codes without flaws.

## Outcomes

Students will be able to:

- Gather information to create a design.
- Identify the main objective for the design as well as any constraints like limiting factors such as task or user requirements, materials, and knowledge that is considered sacred.
- Ideate by generating potential ideas, adding to others' ideas, screening ideas against the objectives and constraints, including choosing an idea to pursue.
- Test the product, gather peer feedback, have inspirations, make changes, test again, and repeat until satisfied with the product.
- Demonstrate their product and describe their process.
- Reflect on their design thinking and processes, and their ability to work effectively both as individuals and collaboratively in a group, including their ability to share and maintain a co-operative workspace.

## Core Competencies



### **Thinking**

- Use imagination to get new ideas.
- Can build on other's ideas.
- Use observations, experience, and imagination to draw conclusions and make judgments.

**Communication**

- Connect and engage with others (to share and develop ideas).
- Communicate clearly about topics that are well understood.
- Gather the basic information and present it.
- Contribute during group activities with peers.
- Take on different roles and tasks in the group.
- Work respectfully and safely in the shared space.

- Express ideas.
- Work with others to achieve a common goal.

**Personal and Social**

- Relationships and cultural contexts.
- Can connect actions with both positive and negative consequences and try to make adjustments.
- Identify different perspectives on an issue.
- clarify problems, consider alternatives, and evaluate strategies.

### Curricular Connections

This unit can be used to help students achieve grade 5 curriculum expectations in the following areas:

**Career Education**

- Recognize the need for others who can support their learning and personal growth.
- Use innovative thinking when solving problems.
- Make connections between effective work habits and success.

**Arts Education**

- Create artistic works using ideas inspired by imagination, inquiry, and experimentation.
- Explore connections to identity, place, culture, and belonging through creative expression.
- Adapt learned skills, understandings, and processes for use in new contexts and for different purposes and audiences.

**Social Studies**

- Use an outline to organize information into a coherent format.
- Create a presentation using more than one form of representation.
- Develop a plan of action to address a selected problem or issue.
- Construct arguments defending the significance of individuals/groups, places, events, and developments.
- Ask questions, corroborate inferences, and draw conclusions about the content and origins of a variety of sources.

**English Language Arts**

- Access information and ideas from a variety of sources and from prior knowledge to build understanding.
- Synthesize ideas from a variety of sources to build understanding.
- Apply a variety of thinking skills to gain meaning from texts.
- Use personal experience and knowledge to connect to text and develop an understanding of self, community, and the world.

- Demonstrate awareness of the oral tradition in First Peoples cultures and the purposes of First Peoples texts.
- Exchange ideas and perspectives to build shared understanding.
- Transform ideas and information to create original texts.

**Mathematics**

- Use technology to explore mathematics.
- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.
- Develop and use multiple strategies to engage in problem solving.
- Engage in problem-solving experiences that are connected to place, story, cultural practices, and perspectives relevant to local First

Peoples communities, the local community, and other cultures.

**Science**

- With support, plan appropriate investigations to answer their questions or solve problems they have identified.
- Decide which variable should be changed and measured for a fair test.
- Identify First Peoples perspectives and knowledge as sources of information.
- Identify possible sources of error.
- Transfer and apply learning to new situations.
- Express and reflect on personal, shared, or others' experiences of place.





## Assessment Evidence

### Summative Assessment

The evaluation project will be the creation of a First Nation arcade game. Student will research a local First Nation Story; either from a book source or through interviewing an elder. They will decide how this story can be incorporated into their arcade game. Student will establish an appropriate goal for their finished product and identify necessary steps to meet that goal. Student will produce an outline of an arcade game that fits specific design constraints. Student will test and re-test their local First Nation arcade game so they can make necessary changes to address any design flaws through debugging their computer code. Student assessment will be based on several criteria. For example, the use of First Nation characters and the language; the inclusion of First Nation game features like background, music, and script; how well the program runs; the use of elements within the program; and ideas generated. (Please see [Appendix A](#) for the assessment rubric).

### Criteria

- Uses methods and procedures for their individual learning process; for example, First Principle's of Learning – Learning involves patience and time.
- Comprehends how Indigenous knowledge can be incorporated into an arcade game to help preserve culture and language.
- Understands necessary elements and processes to coding a working program.
- Demonstrates collaborative work responsibilities, being a good listener, and respect for self and others.
- Applies specified design constraints to coding in the student's arcade game program.
- Identifies what elements that are needed to create an engaging arcade game.

### Formative Assessment

- |                   |                    |                     |
|-------------------|--------------------|---------------------|
| • Discussions.    | • Observations.    | • Peer assessments. |
| • Brainstorms.    | • Gather Feedback. | • Participation.    |
| • Graphic Design. | • Created Codes.   | • Check Ins.        |
| • Exit Tasks.     | • Reflections.     | • Language Use.     |
| • Categorizing    | • Idea Generation. | • Prototypes.       |

### Learning Activities Overview

Students will take part in creating their own local First Nation arcade game using the SCRATCH program. They will choose a prototype with in SCRATCH and re-construct it to fit the given criteria for the project. Students will interview Elders and Knowledge Keepers to gather information on traditional stories and historical traditions. Students will conduct research of traditional stories and historical traditions through other means like books and websites. Students will use their own art designs for game elements and features.

## Planning

### Learning Activity 1 Video Game Introduction

#### LEARNING TARGET

The purpose of this learning activity is to get an understanding of student knowledge. For this learning activity it would be helpful if students had basic knowledge on video games. Students will know qualities and features that make a video game engaging. Students will gain knowledge on how to conduct research to gather information for video game criteria. This learning activity will take 2 class periods.

#### ENGAGEMENT

- Group work.
- Discussions.
- Research.
- Co-constructing criteria activity.

#### MATERIALS

- Chart paper.
- Laptops.
- Books.
- Markers.
- Websites.
- Post-it notes.

#### ELABORATION

First Nation Word ( <i>Northern Tutchone</i> )	Meaning
Zhi dín'in?	What are you doing?
Edhó' gets' echú'	Jump Game

#### TEACHER ACTION / STUDENT ACTION

Time	Instruction
Class 1 60 mins	<p>Prompt the students with a question.</p> <ul style="list-style-type: none"> <li>What type of qualities and feature do good video games have?</li> </ul> <p>Split the students into groups.</p> <p>Have each group discuss the question and write down their thoughts on the chart paper.</p> <p>After students have assembled a list of qualities and feature have each group share what they discussed.</p> <p>Each student can work independently or in groups of 2 to conduct farther research.</p> <p>Students can access information in books or on approved websites.</p> <p>Have students jot down notes on their findings.</p>



Class 2  
60 mins

Students must focus on things like feature, design, mechanics, etc.

Students will continue with their research.

Once students are finished conducting their research distribute five post-it notes to each student.

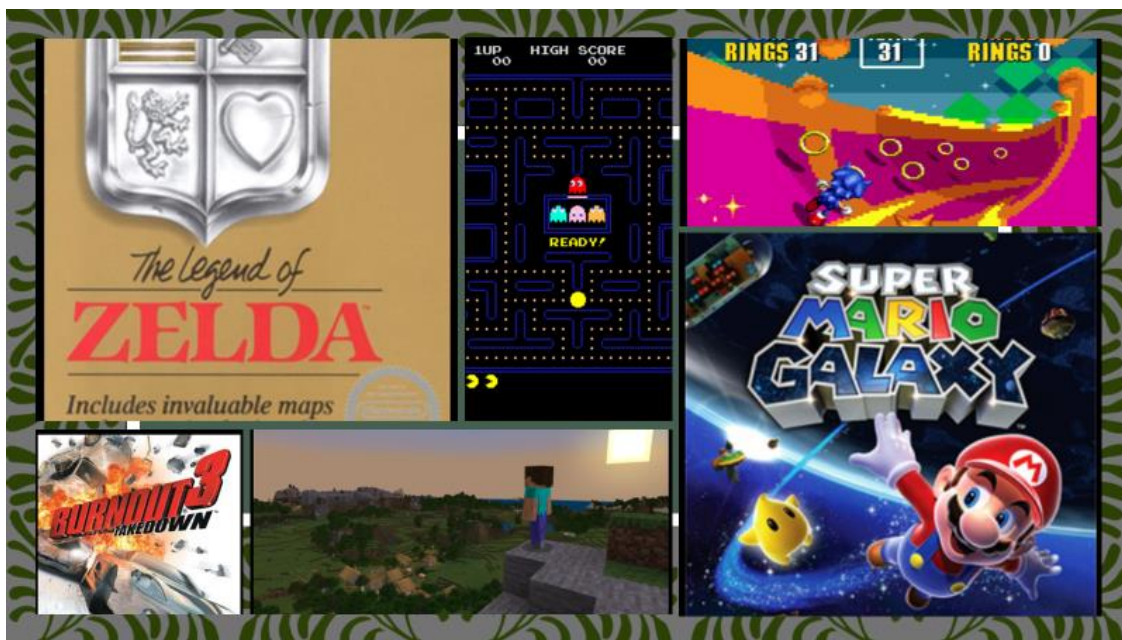
Conduct co-constructing criteria activity.

- Have each student write down 5 main points that they have found.
- Have students stick the notes to the whiteboard.
- Guide the students in categorizing all the notes.
- Co-construct titles for each category.

This will be the student led criteria on what makes a good video game.

### ASSESSMENT

Note and record what students understand and don't understand for future lessons. Adjust teaching accordingly.



Retrieved from: [https://en.wikipedia.org/wiki/List\\_of\\_video\\_games\\_considered\\_the\\_best](https://en.wikipedia.org/wiki/List_of_video_games_considered_the_best)

## Learning Activity 2 Gaming History

### LEARNING TARGET

The object of this learning activity is for students to gain historical knowledge on First Nation games as well as games that use technology. Through cause and effect students will learn how technology colonialism has impacted First Nation culture. Students can ask questions, corroborate inferences, and draw conclusions about gaming history. Students will learn what distinguishes past games with present games and how they are the same. This learning activity will take 3 class periods.

### ENGAGEMENT

- Group work.
- Discussions.
- First Nation Knowledge Keeper.
- Research.
- Venn Diagram.
- Interactive activity.

### MATERIALS

- Laptops.
- Websites.
- Part of The Land Part of The Water.  
See pages 243-249.
- Venn Diagram worksheet.
- Elder's checklist. See [Appendix B](#).
- Chart paper.

### ELABORATION

First Nation Word ( <i>Northern Tutchone</i> )	Meaning
Inyédóhúch'i?	How are you?
Másin	Thank you.

### TEACHER ACTION / STUDENT ACTION

Time	Instruction
Class 1 60 mins	<p>Invite a First Nation Knowledge Keeper to come into the classroom. Specifically, someone who knows about local First Nation's tradition games. Ask them to demonstrate the traditional games. Ask them to explain how they are played and aspects of their history. Some examples are:</p> <ul style="list-style-type: none"> <li>• Snow Snake,</li> <li>• Hand Games,</li> <li>• Back Slapping Race.</li> </ul> <p>Have students attempt each game. Have the students respectfully thank the Knowledge Keeper in Local First Nation Language.</p>

**Class 2  
60 mins**

Recap on previous class Traditional First Nation games.

Prompt the students with questions.

- What are some differences in the video games that we play today compared to the games that the Knowledge Keeper demonstrated?
  - For example, outside/inside; use of tools/use of technology.
- What are some similarities?
  - For example, both are challenging, both may require strategically thinking.

Group students in pairs.

Have groups time to discuss their findings.

Have each group complete a Venn diagram on First Nation Traditional games and Video games.

Prompt the students with questions.

- How has game technology changed over time?
- What are some impacts that have occurred to First Nations people due to the advancement of game technology?

Have a class discussion to gain understanding on what previous knowledge the students have. This will be helpful to guide their inquiry when conducting research on the prompted questions.

Have students begin researching more about the prompted questions.

**Class 3  
60 mins**

Allow students to have more time to finish their research.

**Interactive Activity**

Have four areas in the classroom. Each area has a piece of chart paper with a question.

- What are some key points in which game technology has changed?
- What are some key impacts that game technology has had?
- How has First Nation traditional games changed?
- Do you think game technology effected First Nation games? Why?

Group the students into four groups.

Each group will start at one of the four areas.

Set a timer for 5-10 mins.

Each group will have 5-10 mins to answer the question. When the timer goes off rotate the groups to a new area.

Continue until all areas are done.

Have students from each group read answers that were written down on the chart paper.

**ASSESSMENT**

Do students understand changes that have occurred in technology over the past 100 years? Can students demonstrate comprehension regarding pros and cons to technological advancements and how it has impacted First Nations people? For students that are having trouble recognizing the skill and strategies for building respectful relationships, try and identify the reason behind this. Adapt and reteach.

## Learning Activity 3 Culturally Responsive Game

### LEARNING TARGET

The purpose of this learning activity is for the students to gain knowledge on how an arcade game can be used to preserve First Nation stories, traditions, and language. Students will understand how the use of technology like an arcade game can be use as a tool. Students will be able to answer questions like:

- Can a game design include First Nation culture and be educational?
- How to make a game that will interest the younger generation?

Students should have access to several local First Nation stories to aid in generating ideas. This learning activity will take one class period.

### ENGAGEMENT

- Show a clip of an arcade game.
- Group Discussion.
- Exit Ticket.
- Generating Ideas.
- Mind map.

### MATERIALS

- Many local First Nation stories.
- First Nation legends.
- Whiteboard.
- Grade appropriate historical facts on local First Nations.
- Dry erase markers.

### ELABORATION

First Nation Word ( <i>Northern Tutchone</i> )	Meaning
<b>Tsien!</b>	Quiet!
<b>Hudén' hunday'</b>	Old time story

### TEACHER ACTION / STUDENT ACTION

Time	Instruction
<b>Class 1 60 mins</b>	<p>Pose the question:</p> <ul style="list-style-type: none"> <li>• How can an arcade game be used to preserve First Nation stories, traditions, and language?</li> </ul> <p>Show a clip of an arcade game. (Mario, Sonic, Pacman, Donkey Kong).</p> <p>Group students into 4 or 5 groups.</p> <p>Provide each group several First Nation stories, legends, and historical facts.</p> <p>Allow each group to go through some of the provided materials.</p> <p>Gather students for a group discussion.</p> <p>Pose the question:</p>

- What types of changes can be done in a game like the example shown earlier to make it more culturally responsive to First Nations?

On the whiteboard start a mind map of student response around the word CHANGES.

Some examples of response are:

- Background,
- Characters,
- Storyline.

### Exit Ticket.

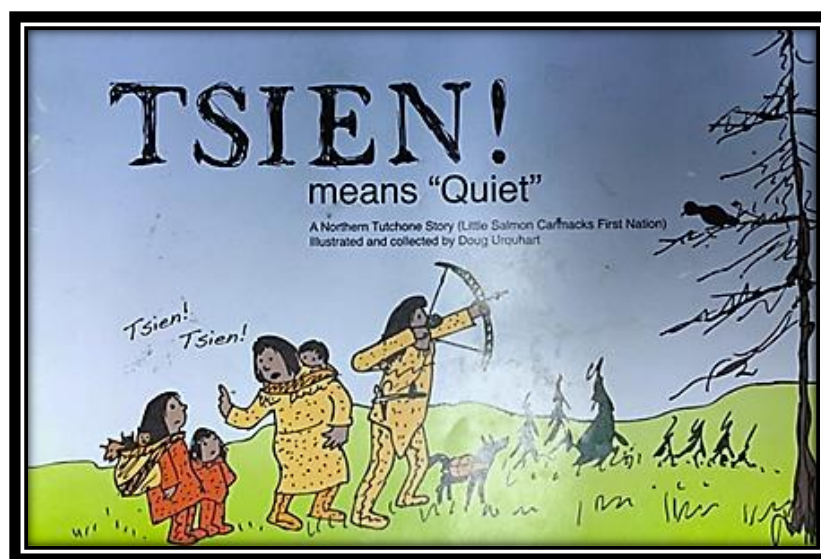
- On a piece of paper have the students write down three ways that they would change a game to make it more culturally responsive.

### EXTENTION

- Invite an Elder, Knowledge Keeper, or another First Nation community member (First Nation educational liaison).
- Take students to a museum that displays First Nation artifacts.

### ASSESSMENT

**Criteria:** Do students understand how Indigenous knowledge can be incorporated into an arcade game to preserve culture and language? Do students know some changes that can be made to an existing video game to make it more culturally responsive? Note and record what students understand and don't understand for future lessons. Adjust teaching accordingly.



## Learning Activity 4 Story Board

### LEARNING TARGET

The goal for this activity is for the students to know how story telling has changed over time. Students will gain knowledge on the different ways to tell a story. Students will generate ideas or add to other's ideas for what storyline they would like in their arcade game. Students will create a First Nation story based on their previous research. This learning activity will take two class periods.

### ENGAGEMENT

- Working with an Elder.
- Demonstrated examples of ways to tell a story.
- Research.
- Writing a storyboard.
- Check in.

### MATERIALS

- Elder's checklist. See [Appendix B](#).
- Examples of ways to tell a story.
- Index Cards.
- Laptops.
- Story Creator app.

### ELABORATION

First Nation Word ( <i>Northern Tutchone</i> )	Meaning
Ledy'ä ndeleḡ?	Do you want tea?
Eḡē ledy'ät sedétlē.	Yes, I want tea.
Hejú, emu ledy'ät sedétlē.	No, I don't want tea.

### TEACHER ACTION / STUDENT ACTION

Time	Instruction
Class 1 60 mins	<p>Invite an Elder to the classroom.</p> <p>The teacher should respectfully advise the Elder about teaching the students about how story telling has changed.</p> <ul style="list-style-type: none"> <li>• Ask if the Elder could tell an oral story to the students.</li> <li>• Ask if they could talk about how story telling has changed for their people.</li> </ul> <p>Have students welcome the Elder into the class.</p> <p>Students should help the Elder feel welcome and comfortable.</p> <p>One student will offer tea to the Elder speaking in the local First Nation Language.</p> <p>Students will sit in a circle to respectfully listen to the Elder tell an oral story.</p>



Class 2  
60 mins

Prompt the students to ask:

- What have they witnessed in terms of how story telling has changed in their time?
- Who are the people that tell oral stories?
- How can you keep the story alive?

Students should thank the Elder in local First Nation Language.

Have one or two students walk with the Elder to help if needed as they leave.

Discuss as a class some other ways that story telling has changed.

- For example,
  - Graphic novels,
  - Music,
  - Poems,
  - Videos,
  - Photo galleries.

### Check in.

Use the index cards.

- Name 3 ways stories can be told.

Students will hand in.

Now that the students have had some access to different types of First Nation stories, they can begin to ideate their own First Nation story.

Students will work individually on their laptops.

Using the Story Creator app, they will produce a short storyline for their arcade game.

Some constraints that their story must have are:

- Must use local First Nation language throughout their story.
- Must have First Nation's concepts within the story.
  - For example, a story about a boy from the Fort Selkirk Nation learning to snare rabbit for food.
- Must be respectful.

Observe and assist each student.

## ASSESSMENT

**Criteria:** Can students work independently with Elders and other students respectfully? Do students demonstrate being a good listener? Do students understand the ways that story telling has changed over time for the First Nation's people? Do they comprehend how advancements in technology has impacted story telling for the First Nation people? Adjust teaching for students that do not understand.



Story Creator App

## LEARNING TARGET

## ENGAGEMENT

- ## MATERIALS

- ## ELABORATION

### TEACHER ACTION / STUDENT ACTION

15

- For example, creating an account.

Have students create an account. (This should be done with their school IDs and passwords).

Allow students the freedom to navigate and explore the SCRATCH site.

There are many tutorials within the program.

The students should choose at least two tutorials to work through.

Once the students have completed two tutorials show them on the projector how to save their work.

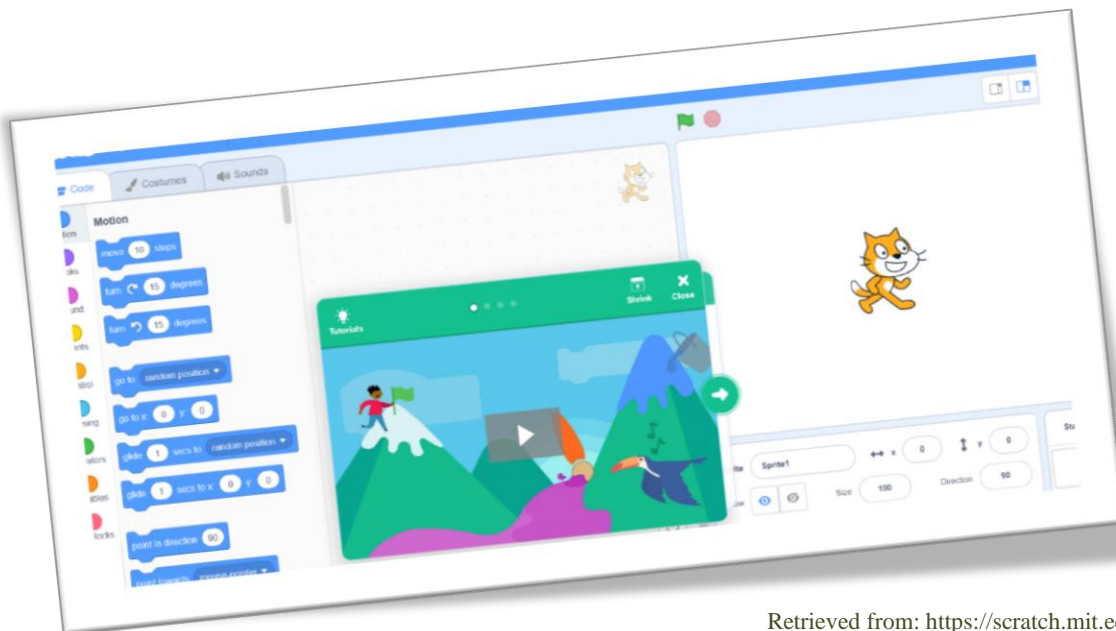
### Exit Ticket

Students can complete the exit ticket reflection.

- Do you feel that this will be an easy program to learn? Why?
- Did you like using this program? Why?
- What was one thing you learned about the program?

### ASSESSMENT

Do the students know how to login, use, and save their work within the program SCRATCH? Through the exit tickets students will demonstrate their understanding and feeling about using the program. If students are finding the program difficult to use, there is simpler version called SCRATCH Jr.



Retrieved from: <https://scratch.mit.edu/projects/>

## Learning Activity 6 Learning to Code

### LEARNING TARGET

The objective of this learning activity is for students to gain further knowledge on how to use the program SCRATCH. Students will understand how different codes are made and used. Students will comprehend how codes are used as commands to perform desired manipulations within their game. This may take several class periods.

### ENGAGEMENT

- Learning to code.
- Mini lessons.
- Re-writing code.

### MATERIALS

- Laptops.
- SCRATCH program.
- PDF copies of projects.
- Projector.
- Variety of coding books.
- YouTube sites.

### ELABORATION

First Nation Word ( <i>Northern Tutchone</i> )	Meaning
Egay	Wolf
Gun Cho	Giant worm

### TEACHER ACTION / STUDENT ACTION

Time	Instruction
Over Several Classes	<p>This learning activity is mostly student lead learning which is guided using the coding books, YouTube tutorials, or PDFs that can be provided. Here is a resource link:</p> <ul style="list-style-type: none"> <li>– <a href="https://inventwithscratch.com/">https://inventwithscratch.com/</a></li> </ul> <p>By using these guiding materials, the students can work at their own pace. The teacher will aid by giving hints and working with students that are struggling. Provide a variety of coding books and access to PDF copies.</p> <p>Students will pick a project from one of the coding books or PDFs. Have students work in groups of 2 for paired programming. One student will read the codes to their partner. The other student will be re-writing the project into the SCRATCH program. Once the program is done students will switch roles.</p>

Periodically the teacher can give mini lessons on certain aspects of the programming process.

For example,

- What the different block colors mean,
- How to change the background,
- How to change the Sprite,
- What concepts are behind the movement of the Sprite, and
- How the (X, Y) coordinate system is used.

The teacher can have a laptop connected to a larger screen to display the mini tutorials for the whole class to see.

Here is a link for some mini lessons:

- [http://scratch.ie/sites/all/themes/scratch\\_theme/resources/suppleness/Scratch%20Lessons%20Tutors%20Manual.pdf](http://scratch.ie/sites/all/themes/scratch_theme/resources/suppleness/Scratch%20Lessons%20Tutors%20Manual.pdf)

Pose the question to the students,

- What type of game are you wanting to create?
  - Some examples are:
    - Racing,
    - Strategy,
    - Role-playing, or
    - Puzzle.

## ASSESSMENT

**Criteria:** Do students understand necessary elements and processes to coding a working program? Do students comprehend how codes are used as commands to preform desired manipulations? Can students build a script that works using the provided elements within the SCRATCH program? If some students are having difficulty, consider ways in which to reteach this material or differentiate for further lessons.

### New skill: Coordinates

Scratch uses a pair of numbers called x-y coordinates to pinpoint a sprite's position on the stage. The x coordinate tells you where the sprite is across the stage, left or right. The y coordinate shows its up or down position. The coordinates will be positive for right and up, and negative for left and down. In Ghost Hunt, you'll use coordinates to send sprites to different parts of the stage.

The x coordinate is always written first

The y axis goes from -180 to 180

The x axis goes from -240 to 240

## Learning Activity 7 Incorporating Story Board

### LEARNING TARGET

The purpose for this learning activity is for students to create a unique First Nation video game. Students will acquire knowledge on how to add in personalized backgrounds and other forms of artwork into their game. Students will understand how to create a storyline within a game. This class will take one period to complete.

### ENGAGEMENT

- Adding unique designs to own game.
- Adding storyline to game.

### MATERIALS

- Laptops.
- SCRATCH program.
- Stories from Learning Activity 4.

### ELABORATION

First Nation Word ( <i>Northern Tutchone</i> )	Meaning
Gyo	King Salmon
Ts'ek'i	Raven
Khyá tan	Trapline
Dintth'in	Mosquito
Hudzi cho	Largest caribou

### TEACHER ACTION / STUDENT ACTION

Time	Instruction
Class 1 60 mins	<p><b>RECAP</b> Learning Activity 3 Culturally Responsive Game. Pose the question:</p> <ul style="list-style-type: none"> <li>• How can I modify this existing game into a First Nation game?</li> </ul> <p>Discuss the design constraints with the students mark them down on chart paper and post them in the class for everyone to refer to when necessary.</p> <p><b>Game Constraints</b></p> <ul style="list-style-type: none"> <li>○ Change the sprite character into a First Nation sprite. Like a hunter, local animal, or the character from your First Nation story created in Learning Activity 4.</li> </ul>



- Change the background to a local picture. Like the Pelly River. It can be of a photo, painting, or drawing that the student created of the local area.
- Change props like palm trees into local trees. Like spruce trees.
- Add in own First Nation drawings or art pieces.
- Have local First Nation language throughout the game.
- First Nation music.

Now that students have set constraints to follow and an idea about what type of game they want to use, have them follow a coding project with that specific type of game.

This will be the foundation for their unique game.

Once they have finished the base for their game, they can begin to modify the game to fit the constraints that were discussed.

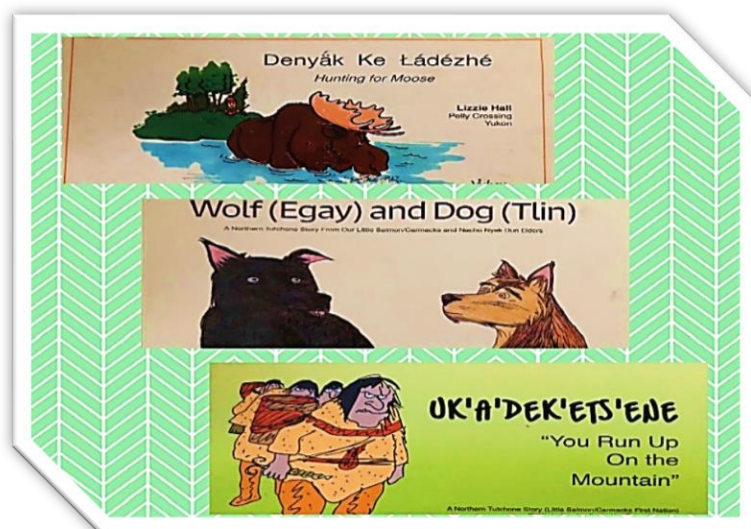
Student can add the ideas that were generated in Learning Activity 4 *Story Board* into their game.

For example:

- The storyline that they created using ideas that were generated from the story UK'A'DEK'ETS'ENE (You Run up on the Mountain) could be a racing game. A race to a mountain top. The characters could be a child and Hûjăw.

## ASSESSMENT

**Criteria:** Did students apply the specified design constraints to their arcade game project? Do students understand what modifications need to be made to create a First Nation theme within their game? If some students are having difficulty with this understanding, consider ways in which to reteach this material.



## Learning Activity 8 Special Commands

### LEARNING TARGET

The learning target for this activity is for students to develop advanced coding skills within their arcade game. Students will gain knowledge on how to use condition blocks containing if-then statements. Students will comprehend how strings and variables are used within the game they are creating. This class will take two periods to complete.

### ENGAGEMENT

- Taking your game farther.
- Exit ticket.
- YouTube video.
- Check in.

### MATERIALS

- Laptops.
- SCRATCH program.
- Projector.
- Index cards.

### ELABORATION

New Words	Meaning
<b>Boolean Expression</b>	Is a true or false expression. Named after a Mathematician George Boole.
<b>Condition</b>	Is a conditional statement based on evaluating if a statement is true or not. In SCRATCH the blocks used are called control blocks.
<b>Variable</b>	Is a changeable value.
<b>String</b>	Are sequences of binary-encoded computer characters. These do include space. More commonly known as letters and numbers, they can be of any length, though in certain circumstances they are limited to 10,240 characters. (SCRATCH Wiki)

### TEACHER ACTION / STUDENT ACTION

Time	Instruction
<b>Class 1 60 mins</b>	<p><b>RECAP</b></p> <p>Recall with the students the criteria they co-constructed in Learning Activity 1 <i>Video Game Introduction</i> for <b>What makes a good video game?</b></p> <p>Working with the game the students have begun to create, students will make modification to the code to create a more interesting and fun game to play.</p>

Discuss with the students about condition blocks, variables, and strings that they have already been using within the game they have created so far.

Show some examples of what each is.

Watch short explanations on YouTube.

Here are some useful links:

- CS Principles: Conditionals - Part 1 Boolean Expressions  
<https://www.youtube.com/watch?v=y3rCKJNOWpA>
- CS Discoveries: Conditionals part I  
<https://www.youtube.com/watch?v=D5fSbCKobko>
- CS Discoveries: Conditionals part II  
[https://www.youtube.com/watch?v=V\\_0ru3RBq08](https://www.youtube.com/watch?v=V_0ru3RBq08)

These links can aid in the explanation of if/then statements or conditional statements. The conditional statements contain variables and strings within them.

### Exit Ticket.

Have the students brainstorm at least two ideas on how they would like to change their game.

### Check in.

- Ask the students how they feel about their game so far?
- Ask about their confidence regarding writing the new code?

The teacher will have a better understanding of where the students feel they are at.

This class will be for students to experiment in their game with the ideas generated from last class.

Class 2  
60 mins

## ASSESSMENT

**Criteria:** Can students identify what elements are needed to create an engaging arcade game? Do students have an understanding on how to use condition blocks containing if-then statements? Do the students comprehend how strings and variables are used in the game they are creating? Adapt and reteach for those who are struggling.

**25** In the "Define car controls" script, change the "key pressed" blocks so that the blue car can be steered using the arrow keys on the keyboard. Then run the game. Both the cars should race along the track, but they can drive through each other at the moment.

Select the arrow keys in all four "key pressed?" blocks.

```

if key right arrow pressed? then
  point in direction 30
  change x by CarSpeed

if key left arrow pressed? then
  point in direction -30
  change x by 0 - CarSpeed

if key up arrow pressed? then
  change y by CarSpeed

if key down arrow pressed? then
  change y by RoadSpeed
  
```

Change the script  
In the "key pressed?" blocks, replace key "d" with "right arrow", key "a" with "left arrow", key "w" with "up arrow", and key "s" with "down arrow".

## Learning Activity 9 De-Bugging

### LEARNING TARGET

The object of this learning activity is for the students to comprehend the process of designing a First Nation arcade game that is completed and that works. Through testing, experimenting, and applying feedback students will develop skills that will support life's many challenges within the field of technology. Through the process of de-bugging their program and finding methods that work students will gain knowledge in the area of problem solving. Allow students time to do conduct tests, work through problems, and find answers. This learning activity will take several class periods depending on students.

### ENGAGEMENT

- Giving/receiving feedback.
- Working with SCRATCH program.
- Problem solving.

### MATERIALS

- Laptops.
- SCRATCH program.
- Resource books for coding.
- Other web sources.

### ELABORATION

New Words	Meaning
De-bugging	A critical thinking process to work through code problems within a program.

### TEACHER ACTION / STUDENT ACTION

Time	Instruction
	<p><b>Reflect</b></p> <p>Gather in a circle.</p> <p>Allow some time for students to reflect on:</p> <ul style="list-style-type: none"> <li>• How their work in their game is going,</li> <li>• How they are feeling about the code they created last class,</li> <li>• Do they have any other ideas they would like to pursue?</li> </ul> <p>Students will continue to work with the program SCRATCH.</p> <p>Students will continue to create and design a workable First Nation video game.</p> <p>Teacher will provide supportive feedback on identifying and diagnosing coding flaws.</p> <p>Students should test other student's games to provide opportunity to give their own feedback.</p>

Students can preform their own research in de-bugging their program.

There are three common types of bugs

- **Syntax bugs** – is when there is a spelling mistakes within the source code.
- **Logic bugs** – is when there is a conditional flaw within an operation leading to incorrect behaviour in the program.
- **Design bugs** – is when the components of each code is working correctly, but the overall behaviour of the program is not working the way it should (Fine and Rhino, 2006).

Students will work through these steps:

- **Recognizing the issue** – identify what part of the codes in the program that not working correctly.
- **Brainstorming** – investigate on the part of the code that is not working.
- **Diagnosis** – identifying the root cause of the problem.
- **Prescription** – plan how the bug should be fixed.
- **Response** – fix the bug.
- **Verify** – check the problem is fixed. Make sure the fix did not create bugs. The codes within the program should be very fluid (Fine and Rhino, 2006).

Students should expect to go through this process several times.

## ASSESSMENT

Once the video game is complete and free of bugs a summative assessment will be conducted. The rubric for this activity can be found in Appendix A.

## Gun Cho (Race to Ft. Selkirk)



McMillan, L. (March 2020). Gun Cho. Race to Ft. Selkirk. Created by a student.

## Learning Activity 10 Presentation

### LEARNING TARGET

The purpose for this learning activity is for the students to showcase their hard work and present their First Nation arcade game to the class. This is a culminating activity where students may try other students video game creations. It will take one class period.

### ENGAGEMENT

- Playing peer's games.

### MATERIALS

- Assessment cards.
- Closed box. One for each student.
- Laptops.

### ELABORATION

First Nation Word ( <i>Northern Tutchone</i> )	Meaning
Tłı̨ą́t'ō sóthän	Really good!

### TEACHER ACTION / STUDENT ACTION

Time	Instruction
Class 1 60 mins	<p>Set up individual student stations around the classroom.            Each station will have a closed box with student's name.            Hand out peer assessment cards.            Each card will have to questions.</p> <ul style="list-style-type: none"> <li>• One thing you liked about the game.</li> <li>• Rate game out of 4. Four being the best.</li> </ul> <p>Each student will play and test everyone's game.            They will conduct a peer assessment for each student using the cards and prompts.            Allow time for students to look over their peer assessments.</p>

### ASSESSMENT

Peer assessment will be conducted.



# Appendix A

## Assessment Rubric

Criteria	Emerging	Developing	Proficient	Extending
<b>Understanding Context</b> <ul style="list-style-type: none"> <li>– Research information First Nation stories or legends.</li> <li>– Listen and connect with Elders and Knowledge Keepers.</li> <li>– Incorporate required information from research into my arcade game.</li> <li>– Write a bibliography to acknowledge and credit the source used.</li> </ul>	<ul style="list-style-type: none"> <li>-Begins to research First Nation stories or legends.</li> <li>-Begins to listen and connect with Elders.</li> <li>-Begins to add minimal information that was collected into arcade game.</li> </ul>	<ul style="list-style-type: none"> <li>-Able to conduct some research on First Nation stories or legends with support.</li> <li>-Able to listen and connect with Elders with minimal support.</li> <li>-Able to incorporate some information that was collected into arcade game with some support.</li> </ul>	<ul style="list-style-type: none"> <li>-Can research information on First Nation stories or legends.</li> <li>-Can listen and connect with Elders and Knowledge Keepers.</li> <li>-Can incorporate required information from research into my arcade game.</li> <li>-Can write a bibliography to acknowledge and credit the source used.</li> </ul>	<ul style="list-style-type: none"> <li>-Shows extensive knowledge of First Nation stories and legends through research.</li> <li>-Independently listens and connects with Elders, Knowledge Keepers, and other First Nation community members.</li> <li>-Independently incorporates this knowledge into a well thought out and entertaining arcade game.</li> <li>-Independently uses a bibliography in APA format to acknowledge and credit the source used.</li> </ul>
<b>Defining</b> <ul style="list-style-type: none"> <li>– Use SCRATCH to code a First Nation arcade game.</li> <li>– Establish a goal for game design.</li> <li>– Identifies and carries out necessary steps to meet that goal.</li> </ul>	<ul style="list-style-type: none"> <li>-Begins to use SCRATCH to code a First Nation arcade game.</li> <li>-Begins to establish a goal for design.</li> </ul>	<ul style="list-style-type: none"> <li>-Able to use SCRATCH to code a First Nation arcade game with support.</li> <li>-Able to establish a goal for design with support.</li> <li>-Able to carry out some steps to meet that goal with support.</li> </ul>	<ul style="list-style-type: none"> <li>-Can use SCRATCH to code a First Nation arcade game.</li> <li>-Can establish a goal for design.</li> <li>-Can identify and carry out necessary steps to meet that goal.</li> </ul>	<ul style="list-style-type: none"> <li>-Shows extended skills in SCRATCH to code a First Nation arcade game.</li> <li>-Establishes many goals for game design.</li> <li>-Identifies and carries out all necessary steps to meet many goals.</li> </ul>

<b>Ideating</b> <ul style="list-style-type: none"> <li>– Develop an arcade game based on a First Nation story.</li> <li>– Use at least two First Nation sprites.</li> <li>– Incorporate First Nation language throughout game.</li> <li>– Design includes a storyline, sound effects, backgrounds, two sprites, two levels.</li> </ul>	<ul style="list-style-type: none"> <li>-Begins to develop an arcade game based on a First Nation story.</li> <li>-Begins to add a First Nation sprite.</li> <li>-Begins to incorporate few First Nation words into the game.</li> <li>-Begins to design a game that includes a storyline, one background, one sprite, one level.</li> </ul>	<ul style="list-style-type: none"> <li>-Able to develop an arcade game based on a First Nation story with support.</li> <li>-Able to use one First Nation sprite.</li> <li>-Able to incorporate some First Nation words into the game.</li> <li>-Able to design a game that includes a storyline, one background, one sprite, one level with support.</li> </ul>	<ul style="list-style-type: none"> <li>-Independently develops an arcade game based on a First Nation story.</li> <li>-Can use two First Nation sprites.</li> <li>-Independently incorporates First Nation language into the game.</li> <li>-Can design a game that includes a storyline, sound effects, two backgrounds, two sprites, two levels.</li> </ul>	<ul style="list-style-type: none"> <li>-Develops an entertaining arcade game based on a First Nation story.</li> <li>-Uses many First Nation sprites throughout game.</li> <li>-Incorporates First Nation language throughout game.</li> <li>-Designs a game that includes a storyline, many sound effects, special effects, several backgrounds, sprites that interact, layers, levels, and different levels of challenges.</li> </ul>
<b>Prototyping</b> <ul style="list-style-type: none"> <li>– Produce an outline of an arcade game that fits all design constraints.</li> <li>– Includes all necessary elements for First Nation arcade game.</li> <li>– Identifies how all elements will be used.</li> <li>– Clearly demonstrates an understanding of how the design criteria will be met.</li> </ul>	<ul style="list-style-type: none"> <li>-Begins to produce an outline of an arcade game.</li> <li>- Begins to include some elements for First Nation arcade game.</li> <li>-Begins to understand some design criteria.</li> </ul>	<ul style="list-style-type: none"> <li>-Able to produce an outline of an arcade game that fits some design constraints with support.</li> <li>- Able to include some elements for First Nation arcade game with support.</li> <li>-Able to demonstrate some understanding of how some design criteria will be met with support.</li> </ul>	<ul style="list-style-type: none"> <li>-Can produce an outline of an arcade game that fits all required design constraints.</li> <li>- Can include all necessary elements for First Nation arcade game.</li> <li>-Can identifies how all elements will be used.</li> <li>-Can clearly demonstrate an understanding of how the design criteria will be met.</li> </ul>	<ul style="list-style-type: none"> <li>-Produces a unique outline of an arcade game that fits all and extends the required design constraints.</li> <li>- Include all necessary and extends elements for First Nation arcade game.</li> <li>-Identifies how all elements and extensions will be used.</li> <li>-Clearly and neatly demonstrates an extended understanding of how the design criteria will be met and executed.</li> </ul>

<b>Testing</b> <ul style="list-style-type: none"> <li>– Conduct one test on First Nation arcade game.</li> <li>– Make necessary changes to address any design flaws through debugging their computer code.</li> <li>– Gather and use feedback from classmates and Elders.</li> <li>– Determine what changes need to be made to meet design criteria.</li> </ul>	<ul style="list-style-type: none"> <li>-Begins to conduct one test on First Nation arcade game.</li> <li>-Begins to make some changes to address any design flaws through debugging their computer code.</li> </ul>	<ul style="list-style-type: none"> <li>-Able to conduct one test on First Nation arcade game with support.</li> <li>-Able to make some changes to address any design flaws through debugging their computer code with support.</li> </ul>	<ul style="list-style-type: none"> <li>-Independently conducts one test on First Nation arcade game.</li> <li>-Can make necessary changes to address any design flaws through debugging their computer code.</li> <li>-Independently gathers and use feedback from classmates and Elders.</li> <li>-Can determine what changes need to be made to meet design criteria.</li> </ul>	<ul style="list-style-type: none"> <li>-Conducts many tests on First Nation arcade game.</li> <li>-Makes necessary changes as well as extends the level of code used to address any design flaws through debugging their computer code.</li> <li>-Gathers and uses feedback from classmates, teacher, Elders, Knowledge Keepers, and other community members.</li> <li>-Determines all changes that must be made to meet design criteria and other extensions.</li> </ul>
<b>Making</b> <ul style="list-style-type: none"> <li>– Construct final version of First Nation game using the Scratch program.</li> <li>– Use workable codes within program.</li> <li>– Game characters are controllable with keyboard.</li> </ul>	<ul style="list-style-type: none"> <li>-Begins to construct a version of First Nation game using the Scratch program.</li> <li>-Begins to use codes within program.</li> <li>-Begins to make game characters controllable with keyboard.</li> </ul>	<ul style="list-style-type: none"> <li>-Able to construct a version of First Nation game using the Scratch program with support.</li> <li>-Able to use some workable codes within program.</li> <li>-Able to make game characters controllable with keyboard with support.</li> </ul>	<ul style="list-style-type: none"> <li>-Independently constructs final version of First Nation game using the Scratch program.</li> <li>-Can use workable codes within program.</li> <li>-Can make game characters controllable with keyboard.</li> </ul>	<ul style="list-style-type: none"> <li>-Constructs flawless final version of First Nation game using the Scratch program.</li> <li>-Uses workable and special command codes within program.</li> <li>-Makes game characters controllable with keyboard or joystick.</li> </ul>

<b>First People's Ways of Knowing and Doing</b> – Use local phenomenon, places or language in arcade game.	-Begins to use local phenomenon, places or language in arcade game.	-Able to use local phenomenon, places or language in arcade game with support.	-Can use local phenomenon, places or language in arcade game.	-Uses local phenomenon, places or language extensively throughout arcade game.
<b>First People's Ways of Knowing and Doing</b> – Work with Elders and other students respectfully. – Demonstrate being a good listener. – Consider other's opinions.	-Begins to work with Elders and other students. -Begins to listen.	-Able to work with Elders and other students with support. -Able to listen sometimes. -Able to consider other's opinions with support.	-Independently works with Elders and other students respectfully. -Independently demonstrates being a good listener. -Can consider other's opinions.	-Works with Elders, Knowledge Keepers, teacher, community members, and other students respectfully. -Demonstrates being a good listener and applies gained knowledge. -Considers other's opinions and shows empathy.

## Appendix B

### Working with Elders Checklist

#### **Working with Elders: A Checklist**

Elders are highly revered and respected people; they are community mentors who provide invaluable support and guidance. In Yukon First Nation cultures, Elders play an essential role in the education of children. They pass on traditional teachings and values through their stories and are considered community role models. It is important to make effective use of local expertise whenever local cultural knowledge is being addressed in the curriculum.

When an Elder, or anybody else, speaks to your students, it is important to follow community protocol. In most communities it would be appropriate to respect Elders and knowledgeable people in the following ways:

- ☐ Contact your Community Education Liason Coordinator, Education Support Worker or Education Outreach Coordinator for support and additional knowledge on community protocols;
- ☐ Contact the Elder you wish to invite to your classroom in person;
- ☐ Allow the Elder some time to think about the offer, do not expect an answer immediately;
- ☐ If the Elder agrees, arrange a time to meet in person to explain what the topic is, and work with the Elder to find out what they want to teach and develop the plan together;
- ☐ Help your students generate questions pertaining to the topic ahead of time for the Elder;
- ☐ Call the Elder the day before to confirm;
- ☐ Arrange for a helper;
- ☐ Make sure there is transportation for the Elder;
- ☐ Open up the environment so the Elder can move freely;
- ☐ Put desks and chairs in a circle with the Elder in a comfortable chair;
- ☐ Help the Elder to sit comfortably;
- ☐ Offer tea and refreshments;
- ☐ Help your students greet the Elder respectfully and if possible in his or her language;
- ☐ Wait for the Elder to speak;
- ☐ Arrange for the honorarium to be ready when the Elder or other community members come to work with your students (honoraria are available through Cultural Inclusion funds);
- ☐ Consider ways to present all traditional stories, songs and dances in the most dynamic way possible;
- ☐ Meet the Elder in an environment outside the classroom, such as cultural camps, local cultural centres, the local community hall or homes;
- ☐ Present the Elder with a gift as a thank you. For example a card made by the students, food items or a small handmade gift.



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