



Coding Trek

THE LEARNING PARTNERSHIP

Teacher Resource Guide



www.thelearningpartnership.ca

#CodingTrek

About The Learning Partnership

The Learning Partnership is a national charity dedicated to building stakeholder partnerships to support, promote and advance publicly funded education in Canada. We do this through five key deliverables - innovative student programs, executive leadership for educators, knowledge mobilization and policy, tribute celebrations of excellence and ongoing collaborations across Canada. Since 1993, more than 6.9 million students have participated in The Learning Partnership's programs.

Coding Trek

Welcome to Coding Trek! In this interactive, technology driven program, students will help a character named Tulip through a series of challenges gathering clues to complete a final breakout challenge. We hope that this program allows teachers to engage your students on a journey with coding, numeracy, language, social studies and science. This program requires no prior knowledge of coding, teachers will learn along with their students and will quickly learn that the students will pick up coding easily.

This manual is designed to help teachers work through the different challenges of Coding Trek. It was written to guide teachers through the program, and to provide different ideas, hints, and clues to deliver the program to students. It is broken up into various challenges to allow teachers to work through at a pace that best suits both teacher and students.

We suggest that before teachers begin each challenge, that they go through and complete the challenge on their own. Each challenge relies on a different set of skills that some students may need more support to develop. If teachers are familiar with how to help, or know resources that students could use, it will make teachers better equipped to troubleshoot any issues that arise.

Technology in Coding Trek

Coding Trek uses the ScratchJr app, available for free on the App Store and Google Play Store. We suggest using ScratchJr on iPads, but it is also available on Android tablets and Chromebooks.

Before introducing the program to students, teachers should ensure that ScratchJr is on all iPads and opens without difficulty. This program is designed to promote collaboration amongst students, and they should work together using the iPad. It is best practice to number or label your iPads, try to ensure that the same group of students uses the same iPad each day which allows them to save their work. This will also assist assessing student work at the end of each challenge.

Coding Trek Breakout Challenge

Coding Trek culminates with a breakout challenge. Throughout the challenges there are different clues for students - such as arrows, pictures and repetitive words. These clues will be necessary to complete the breakout challenge, make note of the clues as students complete the challenges or revisit the challenges while completing the breakout.

We really hope this program is an excellent connection between computer programming, curricular expectations, learning goals, and student engagement.

Good luck and have fun with Coding Trek!

Challenge 1:

Introduction

Estimated Time: 1-2 periods

Description: In this challenge you will expose the students to ScratchJr and build the foundation for the rest of Coding Trek.

Potential Learning Goals:

- Student will be able to confidently set up different programs using ScratchJr.

Directions:

1. The main focus of this challenge is to give students time to ensure they feel confident with ScratchJr.
 - Provide students with ample time to explore ScratchJr and use the supports built into the challenge to help
2. At the conclusion of each class period, do a class check in just to see if anyone is really struggling with how to develop the programs using the drag and drop system. If you see any students that are really struggling, take some extra time to ensure that they have the necessary skills to move forward.

Potential Assessment Criteria:

- Students use the paint editor for characters
- Student uses the paint editor for backgrounds
- Student uses the camera feature for characters
- Student uses the camera features for backgrounds
- Student creates a code with more than one page
- Student is able to confidently build a program using more than one feature

Possible Extension:

- Have the students build a program with their own characters and backgrounds.

Challenge 2:

Computational thinking

Estimated Time: 1-2 periods

Description: Using limited technology students will work through applying computational thinking and how it connects to computer programming. Students will work on sequencing, patterning, and directional instructions.

Potential Learning Goals:

- Students will understand how computational thinking applies to the Coding Trek program.

Directions:

1. With teacher guidance, students are asked to answer questions that connect to developing a sequence, a pattern, and then talk about direction.
2. This challenge concludes with students coding the teacher to move through the classroom.
 - You can either have them develop this code as a whole class project, or individually and have them present how they coded things differently.
 - Teachers should be creative with the blocks students are instructed to use. As mentioned in the Slide deck, the “jump, turn around, and speak” blocks are very popular.

Potential Assessment Criteria:

- Students understand what a sequence is
- Students understand what a pattern is
- Students understand directional instructions
- Students are able to apply computational thinking to successfully code a program that travels from one side of the classroom, to the next

Possible Extension:

- Have the students code other students to wash their hands, walk outside to recess, or get a drink of water.

Challenge 3:

Coding challenges

Estimated time: 2-3 work periods

Description: Students will progress through a variety of coding challenges and lays the foundation for the coding that will be necessary for the remainder of the program. The coding challenges are designed to increase in difficulty and provide the students with foundational coding skills.

Potential Learning Goals:

Students will use problem solving skills, collaboration, and computational thinking to complete a variety of coding challenges.

Directions:

There are two different approaches to complete this challenge

- Present the students with the list of the coding challenges and allow them the time to complete each task their own pace
- Follow the slides and complete each individual task as a class.
 - Students helping students is key. A rule that works well is ask three, then me. Have the students ask three different classmates for their answers, before coming to the teacher for help. Students will naturally take the lead assisting others and the teacher should take a reduced role during the lesson.

Potential Assessment Criteria:

- Students complete all the coding challenges
- Students collaborate in a positive manner
- Students display perseverance when working through the challenges
- Students display initiative when coming up with ways to solve the problems

Possible Extensions:

- Try building a computer program using Scratch Jr. that teaches others how to use Scratch Jr. Have the students use the voice recorder, and the Character speaking to talk about how to run different blocks of code.

Challenge 4

Storytelling

Estimated Time: 3-5 work periods

Description: This challenge is a Choose your Own Adventure story. Teacher should work through the slides as a class and model how to write a story using the cues - First, Next, Then, and Last. The challenge looks at choosing settings, characters, building a story, and then animating it using ScratchJr. Begin with teachers and students by writing a story together, and then students will create their own stories.

Potential Learning Goals:

Students will develop a story using the organized format First, Next, Then, and Last.

Directions:

1. Work through the slides together with the students and collectively write and produce a story using ScratchJr.
 - Use the graphic organizer below to display how to put together the story. You could use pictures, words, or both to set up this story (depending on your class).
2. After the activity has been modeled with the class, the students should then create their own story using the graphic organizer and then begin coding it in ScratchJr.
 - Review the videos about adding backgrounds, characters, and changing pages.
 - If students need extra help, keep referring to these videos, or use the students that figured it out as peer helpers.
3. Have students share and celebrate their work. This helps build community, and allows every student the chance to display what they have done.

Potential Assessment Criteria:

- Students effectively use First, Next, Then, Last in their story
- Students are able to add backgrounds to their projects
- Students are able to add characters to their projects
- Students build a sequential story that makes sense
- Students are able to change pages within their coding project

Possible Extension:

- Have the students retell a picture book or story that they are familiar with using Scratch Jr. They can use the dialogue and animate the characters to match the story.
- This could connect to data management as well. Tally the class as you progress through the choices, and have them graph their results to determine what setting and characters they want to be a part of the tale.

Graphic Organizer:

Show what happens in your story using pictures and words.

Part of the Story	Picture	Words
First		
Next		
Then		
Last		

Challenge 5:

Math challenge

Estimated Time: 3-5 work periods

Description: This is a numeracy challenge. It covers a variety of different mathematics topics including patterning, fractions, and spatial sense.

Potential Learning Goals:

Students will develop a program connected to a variety of numeracy concepts including fractions, patterning, spatial sense, and number sense calculations.

Directions:

1. Students begin this chapter by choosing between the Boreal Forest and the Arctic. This is a great way to infuse science into this Trek.
2. After the students have chosen which direction they want Tulip to travel, the numeracy connections will become evident. In the forest, students will get rid of flies and finding food. The key to this is to develop a repeating program where Tulip walks over the majority, or all of, the backdrop. The fly characters should be programmed to disappear when they come into contact with Tulip. A similar program can be developed to pick up food as well. Make sure the students are coding the right characters when they are building both programs.
3. The Arctic requires the students to have an understanding of fractions. If they don't this could be a good time to introduce or review some of the basics.
4. This program requires four different characters that are all programmed a bit differently. Again, ensure the students are coding the correct characters as they put together their program.

Potential Assessment Criteria:

- Students are able to add backgrounds to their projects
- Students are able to add characters to their projects
- Students are able to code different characters effectively
- Students are able to code characters to react to the other characters in the program
- Students are able to connect different numeracy topics to their programs

Possible Extension:

- Have the students complete the second option of the challenge
- Have the students design a program that animates how Tulip gets to the Boreal Forest, or the Arctic during her travels

Challenge 6:

The Spooky Arcade

Estimate time: 3-4 work periods

Description:

Students will use ScratchJr to build math games that display their numeracy abilities. The games can be either based on Mental Math questions, or Geometrical Shapes.

Potential Learning Goals:

- Students will develop computer programs that display numeracy skills.

Directions:

1. In order to build their math games, students must be able to work with more than one character at a time.
 - Prior to starting this challenge review how to program with more than one character, and more than one page at a time. You may want to review some of the videos in the previous challenges.
2. The games can be either mental math, or geometry. As well, the students can either select mental math or geometry or the entire class can create a program based on the same theme. It really depends on the needs of the students and classroom.

Potential Assessment Criteria:

- Students are able to code for more than one character at a time
- Students are able to create interesting math questions with a variety of answers
- Students code games that run effectively
- Students are able to use more than one backdrop to ask more than one question
- Students properly code dialogue to run the game efficiently

Don't forget about marking different life/learning skills as well. This is a great challenge to look at collaboration, organization, and perseverance.

Possible Extension:

- Build a Math Game that measures the perimeter of different shapes. Use the grid backdrop to help measure the size of the shapes.

Challenge 7:

Science inquiry

Estimated time: 5-8 periods

Description: This challenge turns a science environmental impact inquiry into an interactive story. Students will study different problems humans have created for marine life and turn it into a program that presents their findings.

Potential Learning Goals:

- Students will learn about how humans affect different marine habitats
- Students will learn how to use graphic organizers
- Students will develop research skills and apply them to a final product

Directions:

1. To start this project, develop an "I wonder" wall.
2. Ask the students what they wonder about how humans treat marine life. Then have them post (or help them post) all the questions they have about the topic. This will help them to develop what they want to research.
3. Once you have worked through the 'I wonder' part of the inquiry, decide if you want the students to all research one topic, or if you want them to break off into smaller groups and answer different questions.
4. Have the students research their topic
5. After students have completed their research, have them develop an interactive story that displays their work.

Potential Assessment:

- Students develop an inquiry question about marine life
- Students effectively use a graphic organizer to collect information
- Students properly research the topic
- Students effectively use the information from the inquiry to create an interactive story

Possible Extension:

- Have the students create an interactive story about how we can conserve water to protect our water supply.

Challenge 8:

Community building

Estimate Time: 3-5 work periods

Description: Students will design a program that displays how to be a positive member of the community. The focus is on dialogue, movement, and storytelling, all with a community feel.

Potential Learning Goals:

- Students will learn how to create a computer program that displays how to be a good person in the community.

Directions:

1. Prior to beginning the challenge, decide whether the entire class is going to select the same setting (school, community or global) or if each student group will choose their own.
2. Once the students have selected their setting, have them plan everything out prior to coding. The students should consider the following when planning their program:
 - Who they are creating the message for
 - What setting will they use
 - What characters will they use
 - What dialogue will they use
 - What movement/changes will happen to animate their message

If they plan for these items prior to coding, then the coding process will be quicker, more efficient, and easier to complete. Since this project is open-ended it is hard to anticipate the stumbling blocks the students will face, but teachers can always refer back to previous lessons, or online resources to help the students through this challenge.

Potential Assessment Criteria:

- Students effectively choose an appropriate setting
- Students choose characters that appropriately represent the message
- Students are able to use dialogue to enhance the project
- Students are able to use character movement to enhance the project
- Students create a clear, interesting message

Extension: Have the students build a program that displays how they can help their family at home.

Challenge 9:

Fairy tales

Estimate time: 5-8 work periods

Description: This challenge allows students to build their own computer program that tells the story of a fairy tale. Students will plan and write the story, then animate it using ScratchJr.

Potential Learning Goals:

- Students will write and animate a fairy tale.

Directions:

1. This challenge begins with students spending time planning their fairy tales.
2. Students will write the story first, and then the create their actual settings and characters afterwards.
 - Students can use the template on the following page to organize their work.
3. Once the story is ready, students will code their work. Share the potential assessment criteria with students to help guide their work

Potential Assessment Criteria:

- Students are able to use dialogue to help with the story
- Students use character movement to help tell the story
- Students use a variety of appropriate backgrounds
- Students tell an interesting story with a problem and appropriate solution

Possible Extension:

- Have the students recreate their favourite fairy tale using ScratchJr.

Fairy Tale Worksheet

Fairy Tale Requirements	
Setting What is the setting(s) that you are going to use?	
Good Characters Who are the good guys?	
Bad Characters Who are the bad guys?	
Problem What is the problem that the good guys must overcome?	
Solution How do they solve this problem? Will they use magic?	
Extras What else is involved in your story? Magical Creatures? Talking animals?	

Challenge 10

Advertising

Estimated time: 3-5 periods

Description: Students will create an advertisement for a place in the world that they think Tulip should visit. They will review what advertisements are, and how they can use Scratch Jr. to recreate this.

Potential Learning Goals:

- Students will be able to create an advertisement using different marketing strategies
- Students will be able to animate an advertisement

Directions:

1. Have the students brainstorm different areas around the world where they would like to send Tulip. If time permits, have them do quick research to answer questions like:
 - Where is the place located?
 - What makes it a special place to visit?
 - How far away is this place from where we are?
 - What are some fun things you can do when you get to this place?
2. Students will then brainstorm different types of advertisements (commercials, billboards etc.)
3. Review the marketing strategies that are presented in the slide deck.
 - Decide on how many you want them to use, and make sure they can explain how and why they used the strategies they chose.
4. Students will then create their advertisements
5. Students will present and then have the students vote to decide where Tulip should go next.

Potential Assessment Criteria:

- Students used marketing strategies in their project
- Students completed an advertisement for the place of their choice
- Students used text, voice over, and animations in this project.
- Students used appropriate backgrounds that were either created and uploaded, or loaded from Scratch.

Possible Extensions:

- Have the students create an advertisement for Tulip to convince Tulip to come and visit their school.

Breakout Challenge

Directions: This is a fun way to wrap up the Coding Trek Project. Present the Google Form and Google Slides. Once you have loaded both, you can start asking the students the questions. Once you have an answer, put your results into the Google Form. If it is correct the message telling you to “Keep Trying” will disappear. Once you have completed all the answers click on “Submit” and the form will be sent.

Answer Key:

- | | |
|----------|---------------|
| 1. Tulip | 5. UUDLRLR |
| 2. 4 | 6. 88547 |
| 3. 9 | 7. CODINGTREK |
| 4. TREK | |



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