Coding Quest

THE LEARNING PARTNERSHIP

Teacher Resource Guide 2017

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. For more information on The Learning Partnership, visit thelearningpartnership.ca.

About Coding Quest

Based on provincial curriculum and using a critical inquiry process, students in Grades 4, 5 and 6 learn fundamental coding skills and create a video game through this engaging, student-driven program. Coding Quest focuses on STEM education, 21st Century learning and computational thinking, while incorporating learning skills, science & technology, mathematics, language arts, visual arts and social studies. Students work in groups of 3 to 5 to research, create and code their game. Teachers only need a handful of devices (iPads, laptops, desktops), for students to complete the coding online. Coding Quest culminates with an Arcade for students to showcase their learning.

The Coding Quest program consists of three main components: coding, inquiry and game design. This guide will provide a brief overview of the program with some suggested tips and tricks. For a more in depth breakdown, the lesson plans are on our eLearning Moodle. We've provided some sample assessment criteria, feel free to use the criteria as is or consider co-constructing assessment criteria with your students.

The **coding** component is using the technology to either learn to code, or code the computer game. The **inquiry** is designed to link any curricular area (e.g. science, language arts, social studies…) to the coding. There are two different approaches to the inquiry which is explored in greater depth below. Next, students will complete the **game design** component which provides background to the game, and has numerous opportunities to connect with other parts of provincial curriculum.

Scratch

The platform we suggest you use is called Scratch, a drag and drop block program that is an easy introduction to computer programming. Scratch is a free platform from MIT and can be found at https://scratch.mit.edu/. Students will need an account to save their work using Scratch. For information on setting up educator accounts, please see the guide on the eLearning Moodle.

The teacher **does not** have to be a computer expert to run this program. The Learning Partnership provides all the resources to introduce teachers and students to Scratch. Students will quickly become the experts. The eLearning Moodle has cheat sheets and other resources for more help on how to use Scratch.

Google Slides

We have provided Google Slides for teachers to use with students as they implement the program. The slides will break the lessons down into simple step-by-step instructions for teachers and students. Feel free to copy, download or modify as required.

The Learning Partnership program manager

A local program manager employed by The Learning Partnership is available to support you, to co-teach certain lessons or help you plan your implementation. Please feel free to reach out to him or her with any questions or concerns.

Good luck with Coding Quest!
Please remember to tweet along with us @TLPCanada, #CodingQuest

Lesson breakdown for teachers

Lesson 1

Introduction to Coding Quest & computational thinking

This lesson is designed to introduce Coding Quest and get students excited about the program. It really stresses problem solving and it is important to discuss perseverance and levels of initiative that are required during this program. Students will learn computational thinking skills to prepare them to begin learning to code.

In the first lesson you will also begin to form groups. For this project you want students to work with others who have different talents that can be displayed during the program. Start taking note of students with a propensity for coding as you'll want to spread your 'expert coders' across various groups. After Lesson 1 have some fun with body coding and introduce the coding challenges. This helps launch an enthusiastic classroom into Coding Quest.

Lesson 2

Coding challenges

The challenges will introduce students to coding on the computer. We suggest you work through the first few challenges together, and then let students complete the rest on their own or in a pair. Each coding challenge is completed independently of the previous challenge (i.e. each challenge is not building off the last code created). During this lesson, we suggest you employ a **try three, then me** method. Have students try or ask three different things before coming to the teacher for help. While some teachers provide each student with a coding challenge sheet, others have posted the challenges on chart paper and had students write their names next to the challenge once it's been completed. This provides a quick reference for other students on who they can look to for assistance. A teacher cheat sheet is also available on the eLearning Moodle.

It is encouraged to take up a few different challenges as you go to ensure that the students are working through the project. This could take multiple class periods to complete all the challenges depending on where your students are at when it comes to navigating the technology.

Sample criteria:

- ☐ Student completed all the coding challenges
- ☐ Student is able to discuss how different programs/coding blocks work
- ☐ Student displayed perseverance when working through the coding challenges

If students are completing the challenges independently, you can evaluate the students work on the code. Here are some sample criteria to assess the totality of the coding challenges:

- ☐ Student is able to design a program that works
- ☐ Student is able to explain why he/she used different coding blocks to run the program
- ☐ Student has a firm understanding on how to use Scratch

Lesson 3

Inquiry

At this point of the project, the inquiry isn't linked directly to the computer programming. There are two approaches to facilitating an inquiry in the Coding Quest program. If you and your students are very familiar with learning through inquiry in the classroom, you could choose the open inquiry option. If you are less familiar with inquiry and want to start with a more structured program, then the guided inquiry approach would be best. Select the structure that would best suit your class.

The inquiry portion of the program can be taught in parallel to the introduction to coding. Provide ample time to complete the inquiry portion.

Lesson 4

Game design brainstorm

This is where the students begin to brainstorm and organize their games. Review the Google slides and ensure you have access to the videos in the slide deck. This lesson is intended to excite students about creating their own video game, and then lay the framework for the rest of the game design process. The students will brainstorm, and then complete the Snapshot with various aspects of the game design documents. It is expected that the game will change throughout the process, but the Snapshot provides an early look.

Once the students have completed their Snapshot, it is important to have a conference with them and discuss their game. Ensure their game has a **strong connection to the inquiry topic,** and that it is appropriate for school.

Curriculum connections:

- Active listening
- Oral communication
- Organization
- Initiative

Lesson 5

Game title page and logo

This is a straightforward lesson and an easy connection to media literacy. Work through the slides and have each student create what they think would be a great representation of the video game cover they would use to market their game.

Sample assessment criteria:

☐ Student has written the title in an interesting way

☐ Student has included the game system used to run the program

☐ Student has put the game rating on the cover

☐ The pictures have appropriate colours

☐ The student has included the video game characters

☐ The student has created a title that reveals what the game is about

☐ A game logo is present

☐ There are obvious links to the science inquiry

Curriculum connections:

- Art
- Media literacy
- 3D perspective
- Collaboration

Lesson 6

Game story summary

During this part of the program, students write a game story describing what is happening during the game. Students should refer back to their Snapshot and then write their story in paragraph form.

Sample assessment criteria:

☐ Student used graphic organizer to plan out the game story

☐ Student used an introduction to begin their story

☐ Student used paragraphs to describe what is happening during the game

☐ Student used an appropriate conclusion to end the story

☐ Student used proper spelling, grammar, and punctuation throughout the story

☐ Student revised and edited his/her work when necessary

Curriculum connections:

• Using graphic organizers

• Sequencing (First, then, next, finally)

• Paragraph writing

• Organization

• Collaboration

• Jot notes

Lesson 7

Character origin story

This lesson focuses on point of view or perspective writing. The students are going to develop the backstory to their video game. Where did the character come from, and how did they get to the point where they are a part of this game? Once they have done all the background work, then they can write an autobiography from the point of view of the character.

Sample assessment criteria:

☐ Student used appropriate point of view language throughout the writing (I, me, etc.)

☐ Student wrote an entertaining and interesting character origin story

☐ Student used proper spelling, grammar and punctuation

☐ Student revised and edited when necessary

☐ Student handed in a polished final draft to be assessed

Curriculum connections:

• Short answer questions

• Perspective writing

• Organization

• Collaboration

• Autobiography/biography writing

Lesson 8

Code your game

Now that the students have been introduced to coding, and have completed their inquiry and game design documents they can code their game. Please note, the game may have changed significantly from the original Snapshot, but that is encouraged and the game will likely change again once they begin coding. Some teachers choose to assign the actual coding for homework after a few class periods.

A coding cheat sheet for different types of games the students may want to code is located on the eLearning Moodle.

Sample assessment criteria:

- ☐ The game is appropriate for intended audience
- ☐ The game provides a learning experience
- ☐ The game play is an appropriate level of difficulty
- ☐ The game has multiple levels
- ☐ The characters move through the game easily
- ☐ The game is easy to follow and understand
- ☐ Playing the game is enjoyable
- ☐ The game is creative and original

Lesson 9

Game instructions

At this point, students have created their games and will need to create playing instructions. Students will answer some questions and then use that information to craft instructions to be uploaded to their Scratch project page. Students can also provide sources for any graphics they used and credit anyone who has helped with their game.

If time permits, have students code their instructions to display before their game begins.

Sample assessment criteria:

- ☐ All of the questions have been answered
- ☐ The instructions are easy to follow and understand
- ☐ Student credited all who contributed to the game

Curriculum connections:

- • Procedural writing
- • Organization
- • Collaboration
- • Initiative

Lesson 10

Arcade preparation

The students are almost ready to present their video game at the Arcade. At this point, students should begin creating advertising for their game. We suggest they create a tri-fold board that showcases the entire project (inquiry, research, game design document, etc.). Students should also put together a 30-second elevator pitch to present to the gamers at the Arcade. Follow the lesson plan and slides to assist students as they craft their pitch and tri-fold board.

Sign up for The Learning Partnership Arcade early because spots fill up fast! Also, you should host an in-school Arcade, inviting other classes and other members of your school community (parents, trustees, family members, etc.). There is a guide to planning your in-school Arcade available on the eLearning Moodle with poster templates. In the past, schools have had success partnering with their neighbouring elementary or high schools to deliver a larger Arcade experience.

Sample assessment criteria:

- ☐ Student created a strong connection to the science inquiry
- ☐ Student added the game Snapshot(s) on the display
- ☐ Student displayed all the important coding blocks
- ☐ Student posted the game story summary(ies) for others to read
- ☐ Student posted the character origin story(ies) for others to read
- ☐ Student created and posted an original game cover (title page)
- ☐ Student posted a game logo
- ☐ Student used appropriate colours, designs, and pictures on their display
- ☐ Student used proper vocabulary, punctuation and grammar on the board
- ☐ Overall impression of the display board
- ☐ (Possibly) Student delivers an effective elevator pitch to sell their product

Curriculum connections:

- Art
- Media literacy
- Organization
- Collaboration
- Design
- Technology
- Initiative

The Learning Partnership

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