Counting Letters in Cree

Introduction

This is a free resource for teachers and students and is part of the Callysto project, a federally-funded initiative to foster computational thinking and data literacy in Canadian Grade 5-12 classrooms.

During this lesson, our focus will be on creating self-referential sentences with numbers: that is, sentences like “This sentence has four e’s in it” which correctly count the number of letters that appear. Along the way, we will learn about Cree numbers written in both English text and in Cree syllabics.

Students will see computer code developed that can create longer self-referential sentences, which accurately count many letters within a sentence. They will learn how these sentences can be modeled as dynamical systems, and the algorithm for finding fixed points in the sentence.

The code is developed in the English language for the first notebook. The second notebook shows how similar code can be used to find self-referential sentences in the Cree language. The third notebook works in the syllabic form of the Cree language.

Along the way, students will learn a bit about the Cree language and in particular how numbers are expressed in the language. There are references in the notebooks to reliable sources for information about the Cree language.

Grade Level and Audience

Grades 7 - 12

Curriculum Connections

Through this lesson students will be introduced to some basic vocabulary in Cree, which is an indigenous language spoken in Canada. Students will be introduced to counting in the Cree language.

- Indigenous languages. Computational thinking. Dynamical systems.

- Alberta Education, Cree Language and Culture
- The common curriculum framework for aboriginal language and culture
- Infusing Indigenous knowledge into the curriculum
- Alberta Physics 20, 30: Dynamics, Forces Dynamical systems and fixed points
- https://curriculum.gov.bc.ca/curriculum/indigenous-education-resources

Required Materials

- a charged computer, with internet access, for each student or group
- an internet browser, preferably Google Chrome
- a Google or Microsoft account (Callysto does not collect any personal information)

In-Class Activities

Activity 1 : Self-referential sentences in English
60 mins

Link to the notebook **from Callysto Hub?**
temporary link:
https://github.com/callysto/lesson-plans/blob/cree_letters/notebooks/counting-letters/counting-letters-english.ipynb

In this activity, students will learn about simple sentences that refer back to themselves. These are the so-called self-referential sentences. An easy example is “This sentence has four e’s in it.” Students learn how to create longer sentences either by trial and error, or using a computer with code. The algorithm is based on the idea of finding a fixed point for a dynamical system representing sentences. This activity is done with English sentences only, as an introduction to solving the problem in a simple setting. The next activity addresses the same problem, but with examples written in the Cree language.

Activity 2 : Self-referential sentences in Cree (nehiyawewin)
60 mins

Link to the notebook **from Callysto Hub?**
temporary link:
https://github.com/callysto/lesson-plans/blob/cree_letters/notebooks/counting-letters/counting-letters-cree.ipynb

In this activity, students again learn about simple sentences that refer back to themselves, except that now these sample sentences are written in Cree. The online notebook introduces the students to numbers written in the Cree language, beginning with the numbers one through ten, and building on this base to include the “teens” as well as compound numbers like twenty-three. Students can then attempt to create longer self-referential sentences in Cree either by trial and error, or using a computer with code.

Note that this lesson notebook is written in English, which then explains how the Cree words for numbers are expressed. The computer code is also explained in English, with the Cree text being the output of the code.

Extension Activity 3 : Self-referential sentences in Cree syllabics (nehiyawasinahikewin) 60 mins

Link to the notebook **from Callysto Hub?**
[temporary link](https://github.com/callysto/lesson-plans/blob/cree_letters/notebooks/counting-letters/counting-letters-syllabics.ipynb):
https://github.com/callysto/lesson-plans/blob/cree_letters/notebooks/counting-letters/counting-letters-syllabics.ipynb

This third lesson repeats the second lesson, but with the added feature of expressing the sample sentences in Cree syllabics. Such a sentence looks like this:

> ᒣᑳᐧᐨ ᐁ ᐊᔭᒥᐦᑖᔭᐣ ᐆᒪ, ᓃᔮᓇᓈᐧᐤ ᑭᑲ ᐚᐸᐦᑌᐣ ᐆᒪ "ᐁ" ᒪᓯᓂᐯᐦᐃᑲᓂᕽ.

This is a more challenging lesson, aimed at students who are keen to learn the syllabics writing system for the Cree language.

Reflections

- *What do we mean by a self-referential sentence?*
- *How hard is it to make up a self-referential sentence by hand, with trial-and-error?*
- *What is a dynamical system? What is a fixed point of a dynamical system?*
- *Can you come up with examples of real dynamical systems? What are their fixed points?*
- *Can you count to five in Cree? Can you count to ten in Cree? How high can you count?*
- *How many letters are there in the Cree alphabet?*
- *How many vowels are there in Cree? What is a long vowel? A short vowel?*
- *How many symbols are there in the Cree syllabic alphabet?*

- *Can you use online resources to come up with a usual sentence in Cree?*
- *How would you say "Hello, my name is Dana" in Cree? How would you write it?*

Next Steps

For more information, you can check out our YouTube videos, online courses, or callysto.ca for learning modules, tutorials, lesson plans, exercises and events.

Contact

If you encounter any issues or have any suggestions, please get in touch with us at contact@callysto.ca or twitter.com/callysto_canada.