CANADA LEARNING CODE

Pixel Programming for Step 1 ELL Students

By: Martha Sinopoli
Duration: 60 minutes

LEVEL	SUBJECTS	PROVINCES / TERRITORIES	TOOL
Grades 1-3, 4-6	English as Another Language, Mathematics	Across Canada	Unplugged

Overview

Students will learn new vocabulary (directions, colours, and letters) while completing the unplugged lesson Pixel Programming.

Prep Work

Materials

- Different colours of sticky notes (start with 2 at the beginning)
- Printed upper and lower-case letters (start with a few at the beginning, perhaps using ones that are in the students' names; the letters prepared in the lesson are O, L, H, T, X, C, I, U)
- Printed copy of the Pixel Programming instructions, programs, and solutions: http://bit.ly/pixel-programming-ELL

Key Coding Concepts

- Algorithms
- Debugging
- Sequence

Curricular Connections

Algorithm
A step-by-step set of operations to be performed to help solve a problem

Debugging
Finding problems or 'bugs' in code and solving them

Sequence
Identifying a series of steps for a task. Computers read and perform commands in order

Set Up

Assess prior knowledge so you have an understanding of what your students already know.

Have the printed letters displayed when your students arrive.

Lesson

Use every minute you are working with Step 1 ELLs as a teaching opportunity. You might decide to talk about directions when walking from their class to your workspace. (E.g. “We are going to turn ‘right’ here!” “We are going to go ‘up’ the stairs.” “Turn ‘left’ into this room.” “Please sit ‘down’.” You may demonstrate directions like ‘left’ and ‘right’ with your hands. Review these directions once you arrive at the workspace.

from top to bottom

References

Original Pixel Programming lesson plan https://www.canadalearningcode.ca/lessons/pixel-programming/

Photo from https://www.rawpixel.com/image/2355/free-photo-image-heart-workshop-blank

Activity

1. Ensure that your students know how to pronounce the sticky note colours and letters that you will be using. Have the letters that you will be building clearly displayed in large font.
2. Do Program 1 together.
    - Tell the students that you are going to make a secret picture together.
    - Read the directions aloud. When you come to instruction 2, review the 2 colours that you will be using.
    - After reading Instruction 4, introduce the concept of a comma.
    - Assemble the picture together following the program.
    - Ask what letter the picture is showing. Have students match it with one of the large letters you have displayed.
3. Complete Program 2 together or allow them to try on their own.
4. Complete more programs as time allows.

Assessment

Success Criteria

I recalled directions, colours, letters from other lessons.
I completed Program 7 or 8 independently.

Assessment Ideas

Pre-test for prior knowledge.

Extensions

Add more colours and letters as students gain more vocabulary and knowledge.

Have students create uppercase letters (K, Z) and lowercase letters (t, h, l,) using the sticky notes. Ask them to write the program themselves.

Ask students to spell their names and short vocabulary words (IT, HI, HIT, HOT, CUT, COT, LIT, LOT). Have them write the program for these words themselves.

PIXEL PROGRAMMING

INSTRUCTIONS

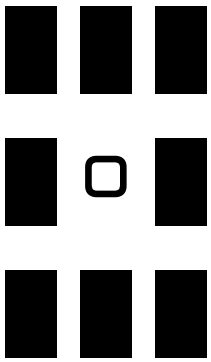
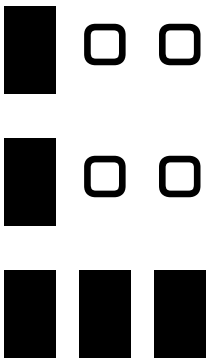
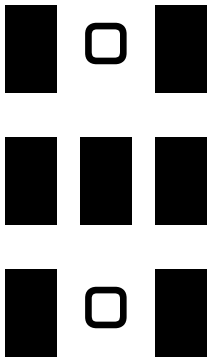
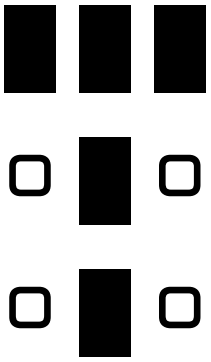
1. **We are programming left → right, top → bottom (like reading!)**
2. **Choose 2 different coloured sticky notes**
3. **The number is the amount of sticky notes to place down in a row**
4. **The comma means switch colours**

PROGRAMS

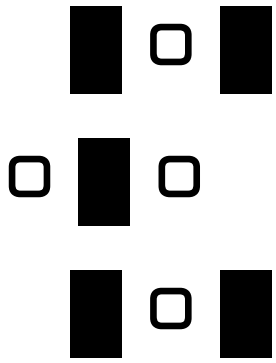
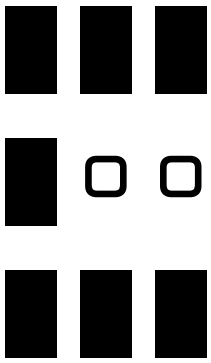
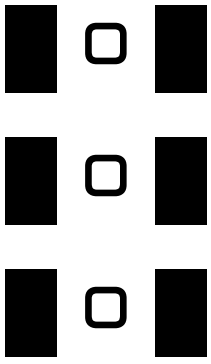
Program 1	Program 2
3 **1, 1, 1** **3**	**1, 2,** **1, 2,** **3**
Program 3	Program 4
1, 1, 1 **3** **1, 1, 1**	**3,** **1, 1, 1** **1, 1, 1**

Program 5	Program 6
1, 1, 1, **1, 1, 1,** **1, 1, 1,**	**3** **1, 2,** **3**
Program 7	Program 8
1, 1, 1 **1, 1, 1** **1, 1, 1**	**1, 1, 1** **1, 1, 1** **3**

SOLUTIONS

Program 1	Program 2
	
Program 3	**Program 4**
	

SOLUTIONS

Program 5 	Program 6 
Program 7 	Program 8