CANADA LEARNING CODE

Pixel Programming

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Duration: 20 minutes

LEVEL	SUBJECTS	PROVINCES / TERRITORIES	TOOL
Grades 1- 3	Mathematics	Across Canada	Unplugged

Overview

Students will use post-its to program pixel art. Then they will be able to write their very own pixel programs.

Prep Work

- Display the Pixel Programming instructions where everyone can see.
- Print/scan the Programs + Solutions for the main activity. Available at http://bit.ly/pixel-programming or 'Printables' section in this guide. (1 copy per group)
- Post-it notes, two different colours (10 per pair)
- Paper and pencils

Lesson

Activity

1. Pair up learners
2. Go through the instructions (below) and run through Program 1 as an example together. Begin by choosing which colour you will start with.

Key Coding Concepts

- Algorithms
- Debugging
- Sequence

Terminology

Debugging

Finding problems or 'bugs' in code and solving them

Pixels

A pixel is a teeny-tiny square of colour. The computer uses lots and lots of pixels together to display anything you see on a computer screen. Pixel stands for picture element.

Sequences

Identifying a series of steps for a task. Computers and Scratch

3. Give one partner a program sheet and the other the solution

read and perform commands in order from top to bottom

4. Have the first partner try to follow a program by placing sticky notes on a table or wall (no peeking at the solution!)
5. Have the other partner check the solution to see if it's correct
6. If it is incorrect, "debug" or try to solve it together
7. Have partners switch roles!
8. If time, have pairs create new pixel programs for each other

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**

Assessment

Learning Outcomes

We followed simple, clear instructions to perform a task
We created and decoded algorithms (when writing instructions)
We made decisions like computers, using conditionals (IF there is a comma, then switch colours)
We worked with our partners to debug (or fix) our instructions

Assessment Ideas

Have learners make their own pixel art in pairs, then submit the instructions used to create it.

Make it into a math game. Have learners count up from 1 and switch colours every time they count a multiple of 4 (e.g.), moving to a new row after every 10 post-its. This may result in some interesting-looking patterns.

Extensions

- Work backwards: Have one partner use post-its to create pixel art, then have their partner write the code for their art. Share the instructions with another pair to see if they can replicate it.
- Spell with pixels: Have learners try to spell out their names using the post-it notes, or create a pixel program for the class to solve that spells out a secret message. Use letters that can be created within the 3x3 grid.

PIXEL PROGRAMMING

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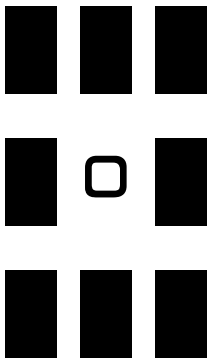
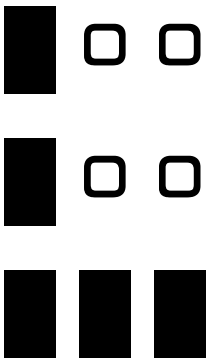
PROGRAMS

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**

SOLUTIONS

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