Names: _____ Date: _____

Mirror Image Lesson Plan

Overview

This 45 minute "unplugged" activity is designed to introduce students to the concept of programming as a series of detailed steps. Students should recognize through this activity that commands that are given in programming must be detailed, and the "computer" (another student, in this case) needs to be explicitly taught what commands it should execute.

- **Materials**
  - One paper for each pair of students with designs in random places (example below)
  - One pencil for each pair of students
  - One blank paper for each pair of students
  - Something hard to press down on during writing

Objectives

- Give detailed instructions to a partner (the "computer") to draw a design without seeing the paper

Introduction

Explain to the students that today, they will working in partners, and each person will be taking on two roles alternately– the role of a programmer and the role of a computer. As the programmer, they will need to say series of steps that they would like the robot to execute. These steps will be for the computer to draw a design on a blank piece of paper. As the computer, they will need to listen to the steps given by the programmer, and they must ONLY execute the steps they are given – they should not assume or "fill in the blanks".

(Teacher Note):

- Break the students up into partners and give each pair a paper with a design, a pencil, a blank piece of paper, and a hard surface on which to press as they draw
- Be on the look out for students who are peeking at each others' drawings – there should be NO peeking!

Activity

Tell the students the following:
Your goal at the end of this activity is to have two sheets of paper with the same exact design on them. You will be given one paper with a design, and one blank piece of paper. The person with the design paper is the programmer, and the person with the blank paper is the computer. You will sit back-to-back, with no peeking on one another's papers! The programmer will give verbal instructions to the computer in an attempt to have the computer draw the same design the programmer sees on his or her paper.

Closing

Bring students together and ask them to share their challenges and successes. Ask the students the following:

- How detailed did your program need to be, in order for your computer to follow the commands perfectly?
- How many of you were told that you were giving commands or following commands that were too simple? How did you give more detail?

Assessment

- Students should complete the "Mirror Images" worksheet

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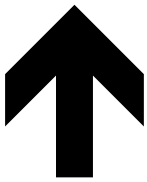

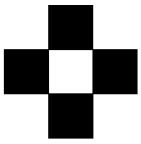

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Mirror Images

Directions: Partner 1 and Partner 2 sit back-to-back. Partner 1 is given a picture that Partner 2 cannot see. Partner 2 is given a blank sheet of paper and a writing utensil. Partner 1 must give oral instructions to Partner 2, using only words, no descriptions, metaphors, etc. The goal is for Partner 2 to give detailed instructions to Partner 1, so the picture that Partner 1 draws is similar or an exact image of the drawing Partner 2 was originally given. Partner 2 may not speak, aside from asking Partner 1 to repeat his/her last instruction. No clarification or explanation may be given. Neither Partner 1 nor Partner 2 is allowed to turn around! GOOD LUCK!

Questions

1. **Partner 1 answers:** How difficult was it to give your partner enough detail to be sure they drew correctly?

   Very Difficult Somewhat Difficult Not Very Difficult Very Easy

2. **Partner 1 answers:** Why did you give the answer you gave in question 1?

   _____

   _____

3. **Partner 2 answers:** How difficult was it to draw correctly, with only the instructions you were given?

   Very Difficult Somewhat Difficult Not Very Difficult Very Easy

4. **Partner 2 answers:** Why did you give the answer you gave in question 1?

   _____

   _____

5. **Both partners discuss and answer together:** How do you think this activity relates to programming a computer (giving a computer directions in a language it understands, in order to perform a task)?

   _____

   _____

   _____

   _____

**This activity was modified from: http://www.teampedia.net/wiki/index.php?title=Back-2-Back_Drawing