Let's Learn Scratch!
Making Sprites Move
Lesson Plan: Class 03 / P / 20

(Rough sketch – design phase)

Overall goal of the lesson: Children will start to use the scratch visual environment to write simple programs.0.5
Prior knowledge required: Familiarity with concepts like programs, algorithms, sequences, loops and conditionals that were taught in previous CSpathshala lessons. Ability to use a basic computer, any web browser, keyboard and mouse.
MODULE 1:
Module time: 35 minutes - 1 hour (depending on how much worksheet practice is done in class)
Goal: Learn more of the Scratch environment and more types of action blocks.
Description: Scratch is a simple to use visual tool that helps children to create short and fun animations. In this process, they develop computational thinking and learn basic computer software concepts like developing an algorithm, writing a program to code the algorithm and debugging and running their program. In this lesson, they will learn some more Scratch concepts like how to move a Sprite around, having multiple costumes for a Sprite, the process of finding and fixing a bug in the program, and get the first exposure to control elements like wait and loop.

Material required:
Physical:

1. A computer that can run the desktop based Scratch 2.0 or browser-based Scratch programming environment at http://scratch.mit.edu.

Electronic:
PPT Presentation for Scratch Introduction
For the browser version, it is recommended that teachers create a login and password for the class to save their work and share projects. For a desktop PC based environment, it is not required but recommended.

WS for Scratch Motion Blocks lesson (two parts).

Procedure Summary:

1. Go to Scratch start page on browser or PC, and do a revision of the basic steps of creating a new project, the concept of a sprite, naming the sprite Billi. Then start gradually adding motion blocks and show how the cat sprite can be made to move across the screen and change direction.
2. Allow plenty of opportunity for free exploration by the students to try to move the cat in different ways. See the WS Part 1 for interesting exercises. (Note that this lesson plan assumes that Grade 3 students does not know about angles, but if they have learned that or can do that in their maths class, then, many more interesting things could be done with motion blocks. Here, we only use the 4 directions - up, down, right and left.)
3. After the students learn this material, introduce costumes - the built-in cat sprite has two costumes which show different leg positions. By alternating these, show how to make the cat appear to walk across the screen, while moving its legs. Along the way, show why the first attempt to do so intuitively results in a bug, and then how to fix the bug by adding a wait. Do the exercise in WS Part 2, which builds on top of the last program in WS Part 1.
4. Finally, setup for the next lesson by urging them to think of a quicker way to express a repeated sequence of code blocks, using the repeat x block.

Procedure Details:

1. Do a very quick review of what they learned in the last class, for example, how to create a project, the Scripts area of Scratch, what is a Sprite, different types of actions like Looks and Sounds - each with their own colored blocks, and how to assemble and run a program using blocks.
2. Create a new project, give it a name and also rename the built-in Sprite Billi.

3. Go to the (blue) Motion section in the scripts area. Note that depending on how you did the revision, you may be here already.
4. Show the 'Move 10 steps' block. Show them how to change the 10 to some other number. We are choosing 50 because it is easier to see the movement of the cat across the screen than with 10 steps.
5. Now run the program to see the Cat move forward. Show how many such blocks can be added in sequence to make the cat move several times.
6. Tip: To make it easy to see, with every change, start with the cat at the left most edge of the screen.
7. Once they are comfortable with this, now add the concept of changing direction. Use the 'Point in direction' block. Walk them through different choices - 90 (right), -90 (left), 0 (up) and 180 (down). The ppt shows an example of making the cat change direction to point down. You can also show examples where it points up or right (no change) or left.
8. Now add some more motion blocks to show how the move steps and point in direction blocks can be combined to move the cat to different places on the screen.
9. Quickly show and review some simple aspects of Scratch, such as how to save the project, revert the project to get to reverse changes, as well as how to insert and delete blocks in the program. This can be perfected during the WS exercises next.
10. Now give the class some practice allowing them to explore these two concepts. The WS has some example of interesting programs they could write to practice. For example, how to make the cat go from one end of screen to the other, how to go around in a square, how to climb up and down a ladder. Remind them that they can also add Looks and Sounds blocks they learned in the previous class.
11. Now teach them about costumes - how to make Billi take a different look - in this example, its legs will appear to be lifted as if preparing to take a step. Show how to make Billi walk by alternating the two costumes.
12. The first version of this program will not appear to work, and we cannot see the costume2. Introduce this as 'a bug in the program' and work on the debugging process. Engage the class in a problem solving discussion. Break the program into two halves where the cat has just switched to costume2 which we couldn't see. Show how each half of the program works and arrive at the conclusion that we just need to add a 'wait' in between.
13. Adjust the program by adding the Wait block from the Control section. Show how the program now runs as expected.
14. Now spend some time exploring costumes by doing the exercises in the WS part 2.
15. Now engage them in a discussion of how to make Billi go all the way to the end of the screen. Some of the students may have done this during their WS exercises. Time-permitting, present a few programs the children wrote to the class. See if they can grasp the fact that it is very tedious to have to keep repeating the blocks again and again, and it is easy to make mistakes.
16. Now introduce the concept of the 'repeat x' loop as an automatic way to repeat the same sequence of blocks x times. Show how a loop could be added to the previous program to make Billi move while switching costumes 10 times. Point out how they have to add a wait between both costume changes - costume1 to costume 2 and again from costume2 to costume1, so the bug from earlier doesn't happen.
17. End the lesson by saying that the next lesson will cover more about loops.

Assessment :

Write the programs in the Worksheet.

Information Broadcast : In Computer Science, the children continued to learn the Scratch programming tool and wrote more programs.