Computer Club – Lesson 3
Scratch Game Development
Approximate Time: 90 minutes

Supplies Needed:
1) Scratch installed on computers - http://scratch.mit.edu/ - a free programming language environment that makes it easy to create your own interactive stories, animations, games, music and art, and share your creations on the web
2) Scratch Reference Guide - http://info.scratch.mit.edu/Support/Reference_Guide_1.4 - can be used on screen rather than printed out
3) "Scratch, Math & Asteroids" document - http://scratched.media.mit.edu/sites/default/files/Scratch2Greenfoot01_0.pdf - can be used on screen rather than printed out

Objectives:
Be able to use basic math concepts with Scratch operator blocks (green)
Be able to use conditional logic with Scratch control blocks (yellow)
Be able to create a game using Scratch.

Anticipatory Set (Grab attention):
Find your favorite version of the game "Asteroids" on http://scratch.mit.edu
Other good examples of games made using Scratch can be found on http://scratch.mit.edu/channel/featured

Essential Question:

What pieces of the game Asteroids will we need to create our own game in Scratch?
What Scratch blocks are needed to create a working game of Asteroids?
What math will be needed?

Big Idea (answer):

We will need Scratch blocks from the **Motion**, **Looks**, **Sound**, **Control**, **Sensing** and **Operators** categories. We will need to be able to make the space ship move, turn, wrap around the screen, collide, explode, shoot and maintain momentum as it moves around the screen.
We will need to enlist math tools including angles, speed, x/y coordinates, variables, conditional logic, relational expressions, sine and cosine functions, velocity, and acceleration.

Lesson:
1.) Find a working version of the game asteroids on http://scratch.mit.edu for discussion
2.) Walk through building the game detailed in the "Scratch, Math & Asteroids" document above getting as far through the game development as possible in the time allowed
   a. Get Moving phase will deal with turning the rocket, thrust and movement
   b. Off Screen phase will deal with screen wrap around
   c. Collisions phase will deal with ship crashing into asteroids, asteroids crashing into ship
   d. Shooting phase will deal with ship shooting bullets, asteroids getting hit by bullets
   e. Momentum phase will deal with gliding based on momentum, thrust and acceleration
3.) Allow students to take the documents with them to finish the phases they did not complete in class

Closing Activity (did they get it):

Show a finished version (http://scratch.mit.edu/projects/dang/1423848) and talk about the variables on the left hand column with regard to making the game work properly, experiment with moving the ship around and note changes in x, y, momentum, direction, and so forth.