***Lesson 5 - Game Research Day***

**Problem statement:**

Your team must design a new game and present your product to the leadership team of Games R Us, your goal is to get approval from the Games R Us executives to produce your game.

This lesson will teach students the basics of how to make a ball bounce using Scratch.

**Learning objectives:**

Students will research a variety of games within Scratch to find ones that are interesting. Students will work with a partner and compare similar games and compare the blocks used in creating the game to learn what blocks they will most likely need to use for their own game.

**Washington State Computer Science Learning Standards (3-5)**

1B-A-2-1

Apply collaboration strategies to support problem solving within the design cycle of a program

1B-A-5-3

Create a plan as part of the iterative design process, both independently and with diverse collaborative teams (e.g., storyboard, flowchart, pseudo-code, story map).

1B-A-5-4

Construct programs, in order to solve a problem or for creative expression, that include sequencing, events, loops, conditionals, parallelism, and variables, using a block-based visual programming language or text-based language, both independently and collaboratively (e.g., pair programming).

1B-A-3-6

Decompose (break down) a larger problem into smaller sub-problems, independently or in a collaborative group.

1B-A-3-7

Construct and execute an algorithm (set of step-by-step instructions) that includes sequencing, loops, and conditionals to accomplish a task, both independently and collaboratively, with or without a computing device.

**Next Generation Science Standards (NGSS)**

3-5 ETS1-1

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost

3-5 ETS1-2

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5 ETS1-3

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

**Common Core State Standards (CCSS) Mathematical Practices**

1. Make sense of problems and persevere in solving them.

6) Attend to precision.

7) Look for and make use of structure.

8) Look for and express regularity in repeated reasoning.

**Soft Skills:**

**Partnership for 21st Century Learning (P21)**

* Think creatively
* Work creatively with others
* Reason effectively
* Use systems thinking
* Make judgements and decisions
* Solve Problems
* Communicate clearly
* Collaborate with others
* Create media products
* Apply technology effectively
* Adapt to change
* Be flexible
* Manage goals and time
* Work independently
* Be self-directed learners
* Interact effectively with others
* Manage projects
* Produce results
* Guide and lead others
* Be responsible to others

**Connections to career and educational pathways:**

**·** Software Developer/Programmer

· Computer Systems Engineering

· Web Application Developer

· Computer Science/Engineering

· Engineering Research & Development

· Game Developer

**Materials**:

* Computers
* Student’s Scratch account linked to teacher’s studio within Scratch (this allows for students to save the projects that they create)
* Engineering Journal
* Game Research worksheet to compare games
* Game Requirements worksheet for final project (have students start thinking ahead)

**Lesson preparation:**

Students should create a free account on Scratch to be able to save their projects.

**Time required:**

60 minutes

**Grouping of students for instruction:**

Students should be working with a partner for this activity. Since students will be finding games that they find interesting they should be working with the same partner that they are going to be doing their final project with.

**What is the instruction?**

Students will be exploring and researching different games within Scratch. They will be finding specific game types that they like and comparing games to find the similarities and differences both graphically and within the coding blocks.

**Lesson:**

1 - Open up a discussion to the class about **what makes a game fun** on Scratch? The discussion should cover the following items: Characters, objects that are good and possibly bad, mechanics (how characters move within game), rules, goals, controls (keyboard or mouse), difficulty levels, playability, sound, color scheme, graphics, and theme

2 - Next talk about different types of games. The following are possible types traditional, racing, role-playing, combat, strategy, simulator, sport, music & dance, or puzzle.

3 - Students are going to work in their partner group that they will be working with for their final project. Each student needs their own computer to compare similar games side-by-side. They also need to take notes in their engineering journal and on their Game Research worksheet.

4 - Allow students to search a variety of games and pick a few games that are similar to each other so they can compare the coding blocks and note what specific blocks the coder used.

5 - Before finishing the lesson take the time to introduce Game Requirements which also shows different constraints on the worksheet so students can start thinking about their final project.

6 - Students can also use print material to do their research too. See the resources list for suggestions.

7 - Within their engineering journals students start listing features that they want to include in their final game project.

8 - If students finish all of the above requirements for researching games and have a good idea what they are going to do for their game then they can start storyboard the layout of their specific game within their engineering journals.

**Accommodations:**

Any students that are physically impaired can partner up with another student to be able to be successful and follow along with the lesson. To make the team stronger you could make it a triad instead of partners.

**Extensions**:

Students that finish early can begin storyboarding their final game project.

**Assessment**:

Assessing takes place within the student engineering journals and how they have answered the questions within the lesson and also their reflection question.

1 Torp, L., & Sage, S. (2002) Problems as Possibilities: Problem Based Learning for k16 Education (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development