LESSON PLAN OUTLINE
TITLE: Code the Iditarod Trail Sphero Project

Developed by: Kari Wright

Discipline / Subject: Coding/Computer Science, Math, Literacy

Topic: Computer Coding

Grade Level: 2-8

Resources / References / Teacher Materials:

1. Trail Copies (1 per group)
2. Bulletin board paper (1 per group)
3. Tape
4. Song copies and song-"She'll be Comin' Round the Mountain"
5. Spheros or other coding robot device
6. iPads with Sphero.Edu app
7. Instruction sheet

Student Materials:

- Trail taped onto large bulletin board sheet (1 per group)
- Sphero or other coding robot device (1 per group)
- iPad with app installed (1 per group)
- Notebook and Pencil
- Song copies

Standards Addressed:

1. 1A-CS-01 Select and operate appropriate software to perform a variety of tasks.
2. 1A-AP-12 Develop plans that describe a program's sequence of events, goals, and expected outcomes.
3. 1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
4. 1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
5. 1B-DA-07 Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea.
6. 1B-AP-16 Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development.
7. 3A-AP-22 Design and develop computational artifacts working in team roles using collaborative tools.

Learning Objectives:

1. Create products related to curriculum content using technology.
2. Use technology to create products, identify patterns, problems, make predictions, and propose solutions.
3. Make logical connections between items in a sequence.

Assessment:

The trail project itself in tandem with lots of teacher observation. Ongoing assessment will include the ability to solve problems, debug coding errors, and the overall code accuracy.

4. Measure and estimate lengths	

Procedure (Engagement, Lesson, Conclusion):

1. Begin by hooking them with the song about the trail checkpoints. The songs are to the tune of "She'll Be Comin' Round the Mountain." This will give them familiarity with the names of the checkpoints.
2. Next, get them excited about the project by showing the sample video.
3. Review the basic workings of the Sphero and expectations for students. Split them into groups of 3-4 with 1 Sphero and iPad per group. Each group will also have a large piece of bulletin board paper with the trail pieces creating the trail and taped down.
4. Explain that their objective is to code the Sphero to travel the trail using block code, stop at each checkpoint, and code it to speak the name of the checkpoint. They must also have 2- 8 hour layovers and 1- 24 hour layover. The Sphero must be coded to "declare" it verbally and then count the correct number of seconds.
5. Instruction will need to be given as well as trial and error on Sphero movement as students work. They can either code it to move at a faster speed for less time or a slower speed for more time. Mastering this skill is the only way to complete the task.
6. At the project conclusion, not all students will successfully make it to Nome. Have a discussion that relates this to actual mushers in the Iditarod. Not all will meet their goal. Not all will finish the race. It is about doing their absolute best and giving it all they have, even if they don't make it to Nome.

Modifications for Special Learners:

- Work with a group of understanding and patient partners
- Lots of guidance, support, and positive reinforcement

Technology:

- Spheros or other robotic technology
- iPads
- Video and projection equipment to watch
- Song- "She'll Be Comin' Round the Mountain"

Other Information:

- Students will need to have basic understanding of Sphero operation
- To keep students from having to begin at the start with each new piece of code added, keep a "working" column of block code separate from the "we know it works" column. When each piece is proven successful, then add it to the "we know it works" column.

Enrichment Ideas:

- Students can add additional effects to the Sphero resembling Iditarod details (barking, cheering, clapping, speaking, lights, etc.)
- Add details to the trail background/bulletin board paper (mountains, rivers, coastline, native wildlife, trees, snow, cabins, mushers and dogsleds, etc.)
- A gallery walk in the gym or other large open space where students can show others, teachers, community members, etc.

- Just as some checkpoints in the Iditarod have prizes, utilize your own school reward system for making it to these checkpoints, or every checkpoint if you'd rather, to keep them motivated.

Notes: