



Mrs. Gentile's Lesson Plan

I.U.P. June 13, 2017 9:00 –11:00am

Lesson Title: Introduction to Programming for High School Students

Summary: Through the use of www.khanacademy.org, young people will explore the use of variables and conditionals to animate objects. Logical, sequential and critical thinking drive their mastery of efficient coding strategies. Basic examples of Cyber Security First Principles are applied throughout their learning.

Grade Band:

9-12

Time Required:

2 50-minute sessions

Lesson Learning Objectives/Outcomes

Upon completion of this lesson, students will be able to:

Evaluate algebraic expressions for given values, evaluate algebraic expressions for user-defined values, draw simple characters, create simple animations, set necessary parameters for functions, perform operations involving loops and conditional statements

Materials List:

Computers with Internet connection Classroom Board w/marker , eraser
Directions for which Khanacademy lessons to complete

How will you facilitate the Learning?

Sessions 1 and 2:

- 1) Students will log-in or create an account in Khanacademy. I will discuss the importance of never allowing a program to “save your password.”
- 2) On Khanacademy, we will view a video from Pixar animation about how mathematics and coding are used to make computer-generated characters “come to life.” (Welcome to Rigging + Math meets Artistry)
- 3) I will present students with the task: Create an animation of your first initial which translates, expands and changes color as if on a neon sign in Hollywood.
- 4) Students will brainstorm what it takes to carry out the task on a real sign, and we will record these thoughts on the board for reference throughout the session.
- 5) Students will go to www.khanacademy.org to watch videos and complete corresponding projects to work towards their “Name in Lights” task.
- 6) After some exploration time, it would be appropriate to discuss *Simplicity*, as it relates to the real javascript behind some of the predefined commands we are using, such as draw, fill, mouse x, mouse y, which the narrator says are “autocompleted.”
- 7) As students complete each project at their own paces, I will check them off on my roster, as a means of informal assessment.

- 8) As the coding becomes more complicated with “Logic and If Statements” being the ultimate video lesson/topic.
- 9) Students will show off their “Name in Lights” projects so far, and assist one another with helpful suggestions.
- 10) Given time, we will conclude the session with a Quizizz to review the aspects of coding learned today as well as Cyber Security First Principles.

11) **Mapping to Cyber Security First Principles (in bold):**

Students will identify applications of the Cyber Security First Principles within Khanacademy’s Javascript instruction:

Simplicity – addressed by the use of predefined commands where we users do not know the Javascript creating the function.

Domain Separation – addressed with advanced learners who know how to incorporate their own files into Khanacademy programs

Process Isolation - addressed when I proposed the possibility of working on Khanacademy and javascript programming while having one’s grades open in one tab and listening to music on You-tube

Assessment of Learning:

TYPE

Project

Quizizz (on-line assessment)

Name/Description

Create a program w/specified requirements

On-line coding vocabulary practice, quiz, game

Accommodations:

Khanacademy’s video lessons provide self-paced instruction and extra review materials at the end of each section.

Description of Extension Activities:

Students will be encouraged to pursue the lengthy list of javascript tutorials available on Khanacademy and to share their creations during camp breaks.

Acknowledgements:

GenCyber Security First Principles concepts

www.Khanacademy.org



Mrs. Gentile's Lesson Plan

I.U.P. June 12, 2017 2:00 – 4:00pm

Lesson Title: Introduction to Programming for Middle School Students

Summary: Through the use of object-oriented (block) coding, young people explore the use of variables and conditionals to animate objects. Logical, sequential and critical thinking drive their mastery of efficient coding strategies. Basic examples of Cyber Security First Principles are applied throughout their learning.

Grade Band:

6-8

Time Required:

2 50-minute sessions

Lesson Learning Objectives/Outcomes

Upon completion of this lesson, students will be able to:

Evaluate algebraic expressions, create animation, perform operations involving loops and conditional statements

Materials List:

Computers with Internet connection

Classroom Board w/marker , eraser

How will you facilitate the Learning?

Session 1:

- 1) Students will join my Google Classroom, if possible on IUP's server.
- 2) I will present students with the task: Make a simple soccer shoot out animation that keeps track of goals and makes the "sprite" do a funny dance when it gets 10 goals.
- 3) Students will brainstorm what it takes to carry out the task in real soccer games, and this will be recorded for reference on the classroom board.
- 4) Students will go to www.scratch.mit.edu to create an account or login, with the strong reminder to never agree for a computer to "save password."
- 5) Initially, I will guide inexperienced students to observe the functions of various blocks that are available for our task. More experienced learners can create at their own paces. This is a good time to discuss *Simplicity*, as it relates to the real javascript behind the blocks we are using.
- 6) Students will be grouped by ability/experience with Scratch and then given time to explore the coding needed to complete the task. More experienced students will be challenged to use their best skills to impress us all.

Session 2:

- 1) Student will show their programs from Session 1 so that more advanced students can make suggestions to help everyone learn.
- 2) In session 2, depending upon time and the rate of acquisition in Session 1, students will play and “see inside” other programs made by people in the Scratch community.
- 3) For informal assessment, conduct a type of scavenger hunt with oral questions such as: Look for a loop that creates motion, one that tests boundaries, one that asks for user input, etc. Additionally, they will be asked to identify the use of variables in computational algorithms and other conditionals and to explain the function of those parameters.

4) Mapping to Cyber Security First Principles:

Finally, given a written matching “quiz,” students will pair up, using their GenCyber cards to identify applications of the Cyber Security First Principles within Scratch, with special emphasis placed upon these three:

Simplicity – addressed by the use of Javascript applied in object-oriented programming

Domain Separation – addressed with advanced learners who know how to incorporate their own files into Scratch programs

Process Isolation - addressed when I proposed the possibility of working on Scratch while having one’s grades open in one tab and listening to music on You-tube

Assessment of Learning:

TYPE

Name/Description

Project (Session 1)

Create a program w/specified requirements

Oral Questioning (Session2)

Identifying the use of parameters in programs

Writing Assignment (Session 2)

Given matching sheet, students will identify applications of Cyber Security First Principles in Scratch

Accommodations:

Grouping by ability for program creation

Grouping in mixed ability groups for Oral Questioning and Matching Sheet

Description of Extension Activities:

Students will be encouraged to create an additional Scratch program to share during camp breaks: Make a bouncing ball which when it touches a sprite, the sprite changes size and color. Then when the sprite is 4 times the original sprite, it will do some kind of silly dance.

Acknowledgements: GenCyber Security First Principles concepts