FORTNITE

FUNCTIONS IN FORTNITE:

CREATING A TOWER ESCAPE TRIVIA GAME

Content/Grade: Computer Science/Hour of Code: Grades 8–12
Lesson Timeframe: One hour

LESSON/CLASS/GUIDE INFORMATION

Lesson Title: Functions in Fortnite: Creating a Tower Escape Trivia Game

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Lesson Timeframe: One hour

Teacher Guide

Student Guide

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DESCRIPTION OF CLASS / LEARNING ENVIRONMENT

This lesson is designed for Hour of Code during Computer Science Education Week. It can be used in any curricular area interested in participating in Hour of Code, or outside of Hour of Code in a game design or computer science course.

This can serve as a stand-alone lesson, or be used in conjunction with the other activities to complete a larger project.

Author Steve Isaacs teaches Game Design and Development as a quest- or choice-based learning environment that provides students with opportunities to take different approaches to meeting the learning outcomes based on their own interests, in terms of content as well as project options.

Author Brian Dickman studied computer science, and operates a full-time game development studio that produces entertaining and educational content inside of popular video games.

LESSON OVERVIEW

Do you have what it takes to escape the Trivia Tower? Better yet, do you have what it takes to create a trivia tower escape game?

This activity will demonstrate the use of functions in Fortnite Creative as you are tasked with creating a game that requires the player to answer a number of trivia questions in order to escape. Each correct answer will trigger the function to allow the player to advance along with a rewarding tune and visual effect. Incorrect answers will trigger not-so-pleasant sound and visual effect and require the player to try again.

By completing this activity, students will understand the basics of functions as they relate to coding through the use of the sequencer and a series of devices.

DESIRED RESULTS

WHAT ARE THE LEARNING OUTCOMES FOR STUDENTS?

ESSENTIAL QUESTIONS/BIG IDEAS

Can students learn computer science concepts as part of a meaningful activity rather than simply learning syntax as an isolated skill?

Will learning computer science concepts like functions through an activity in Fortnite Creative generalize to understanding the concept in a coding environment?

Can students learn computer science concepts through game mechanics?

Will students show more motivation to learn computer science when the concepts are introduced in a game environment?

LEARNING OUTCOMES/OBJECTIVES

The student will be able to:

- Demonstrate an understanding of functions as a computer science concept
- Apply the understanding of functions in the context of a game
- Create a puzzle in a game environment that incorporates the use of functions

LESSON PLAN

LEARNING ACTIVITIES

HOW TO USE THE FORTNITE CREATIVE HOUR OF CODE LESSONS

This series of lessons has been designed to provide flexibility. Each lesson is set up as a stand-alone lesson to teach a coding concept in isolation, in the span of about an hour, as part of the Hour of Code initiative. The teacher can choose which lesson students complete or students can choose one (or more) that appeals to them.

The lessons also work together so that a student could complete all five lessons and create a game experience with five different puzzles demonstrating the different concepts. Likewise, students can work in groups where each student or small group completes one of the activities as part of a larger project.

Each lesson is accompanied by a student guide with notes to guide the educator in delivering the lesson and supporting students in the process.

USING FORTNITE CREATIVE:
To facilitate teaching with Fortnite Creative, we have developed a short course for educators get familiar with the tool and how to use it in the classroom. We encourage you to take the course and earn the badge!

TEACHING WITH FORTNITE CREATIVE ONLINE COURSE:
https://www.unrealengine.com/en-US/onlinelearning-courses/teaching-with-fortnite-creative

INTRODUCTION: FUNCTIONS

FUNCTION: A function is a unit of code that is often defined by its role within a greater code structure. Specifically, a function contains a unit of code that works on various inputs, many of which are variables, and produces concrete results involving changes to variable values or actual operations based on the inputs. – from Techopedia.com

Or more simply put:
FUNCTION: A piece of code that you can easily call over and over again. – from code.org

For example, the activity in this lesson will have students set up a number of functions to be used to run a trivia game show in Fortnite Creative. Essentially, each function (represented by the sequencer) will run a series of commands (using devices) in the game.

Pseudocode is the act of simulating writing code to illustrate the idea that the code would represent. Pseudocode would show the general structure but does not necessarily follow proper syntax. In these lessons we will periodically use pseudocode to demonstrate the concepts.

In terms of pseudocode, this could look like:

Function 1 (askQuestion): starting the round/asking the player a question
Function 2 (startTimer): the countdown timer

```
myFunction(askQuestion)
	Do the following
		Reset answer buttons
		Play sound
		Choose random number for trivia question
		Present the Question
		myFunction(startTimer)
			Start countdown timer
			If countdown gets to 0 Then
				Time is up
				Play sound
				Show message (“Sorry, you did not answer in time”)
				Activate next question
		EndFunction
EndFunction
```

Function 3: (correctAnswer)

```
myFunction(correctAnswer)
	Do the following
		Play happy sound
		Show message (“Correct! Great job!!”)
		Add point to score
		Activate next question
EndFunction
```

Function 4: (wrongAnswer)

```
myFunction(wrongAnswer)
	Do the following
		Play bad sound
		Show message (“Sorry, Try again!”)
		Activate next question
EndFunction
```

In the example above, when the function (askQuestion) is initiated, a number of things happen:

1. Reset answer buttons
2. Play a sound to indicate the question will be coming up
3. Choose a random number to determine which trivia question to ask
4. Present the question to the player

Then we introduce another function (startTimer) which initiates:

1. Start countdown timer
2. Play a sound if the timer reaches 0 to conclude the opportunity to answer this question

We add two additional functions (correctAnswer) and (wrongAnswer). These initiate the following:

1. Play a sound
2. Adjust score if appropriate
3. Display a message
4. Activate the next question

Here is a video that explains functions:
CS Principles: Defining and Calling Functions: https://youtu.be/yPWQfa4CHbw

Functions can be used in any coding language, and also in environments like Fortnite Creative. In Fortnite, we will use the sequencer and place our events/actions within the sequencer so that when the sequencer is activated, the actions inside will be executed.

ACTIVITY

Refer to the Teacher Guide for the step by step directions for the activity.

Students should access and work from the Student Guide

EXTENSION ACTIVITIES

Refer to the **Student Guide with Teacher Notes** for the step-by-step directions for the activity.

EXTERNAL RESOURCES

Teaching with Fortnite Creative Online Course:
https://www.unrealengine.com/en-US/onlinelearning-courses/teaching-with-fortnite-creative

Code.org: http://www.code.org

Hour of Code: https://hourofcode.com/us

Makecode Arcade: Functions: https://arcade.makecode.com/courses/csintro2/functions

CS Principles: Intro to Variables Part 1: https://youtu.be/G4IG_PEWFjE
CS Principles: Intro to Variables Part 2: https://youtu.be/ijjVDBPwAIo

Definition of variables: https://whatis.techtarget.com/definition/variable

ASSESSMENT

RUBRIC

CREATING A TOWER ESCAPE TRIVIA GAME IN FORTNITE CREATIVE:

Creating a Scoring System Using Variables

	Developing	Competent	Proficient	Distinguished
Project Content / Learning Objectives	Project does not convey the required information or understanding as it pertains to the learning objectives.	Project shows a basic understanding of functions and how they can be represented in the game.	Project reflects understanding of functions and coding and how that can be accomplished through the use of the sequencer to initiate a function in the game.	Project reflects exemplary understanding and application of functions through the gameplay. Mastery of the learning objectives are met or exceeded.
Project Development/ Functionality	Project does not work, or has major flaws that prevent its intended use.	Project demonstrates basic functionality, and has only minor flaws.	Project functions in the way the student intended and provides general guidance for the end user.	Project is functional and refined, with extra features that exceed the requirements.
Project Aesthetics/ Design	Project requires more attention to the look and feel of the experience as well as the general design.	Project shows some attention to aesthetics and thoughtful design, but is incomplete or lacking in some aspects of layout and design.	Project is well organized and pleasing to the eye; the design makes sense in the context of the activity and creates a well designed experience for the player.	Beautiful design. The environment is inviting and provides the user with an engaging world to explore in order to experience the puzzle activities.
Reflection	Student demonstrates difficulty describing functions and the connection between code and this activity.	Student can mostly describe/ reflect upon the basics of functions, and has a general understanding of how that translates to this activity.	Students provides a thoughtful reflection/ explanation of the functions and how sequencers model functions in Fortnite Creative.	Student can eloquently explain (and apply) the concept of functions related to the use of sequencers to model them, and how that generalizes to coding.

STANDARDS MAPPING

Common Core Standards
ISTE Standards for Students
NCSS Standards
NGSS Standards

CSTA Standards for Students:
https://csteachers.org/Page/standards

1A-AP-09
Model the way programs store and manipulate data by using numbers or other symbols to represent information.

1B-AP-10
Create programs that include sequences, events, loops, and conditionals.

1B-AP-12
Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.

1B-AP-15
Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

2-AP-10
Use flowcharts and/or pseudocode to address complex problems as algorithms.

2-AP-13
Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.

2-AP-14
Create procedures with parameters to organize code and make it easier to reuse.

2-AP-17
Systematically test and refine programs using a range of test cases.

3A-AP-13
Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

3A-AP-16
Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.

3A-AP-17
Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

3A-AP-18
Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.

3A-AP-22
Design and develop computational artifacts working in team roles using collaborative tools.

INTERDISCIPLINARY AND 21ST CENTURY CONNECTIONS

This lesson covers areas related to coding/Computer Science.

21st Century Connections:

- Critical thinking
- Creativity
- Collaboration
- Communication
- Technology literacy
- Flexibility
- Leadership
- Initiative
- Social skills

MODIFICATIONS AND ACCOMMODATIONS

Provide modifications and accommodations as appropriate based on student needs, IEP, 504, etc.

Students can work in teams to integrate a paired programming approach

Sample map can be provided for students to deconstruct / modify

Provide adaptive controller / game controller if necessary.

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