WAMC Lab Template

Math Concept(s): Variables
Source / Text: Code.org
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Date: 6/24/19 Summer Conference 2019

Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

Lab Plan

Lab Title: Variable dice game

Prerequisite skills: completion of Conditionals in Farmer

Lab objective: At the completion of this lab the students will be able to understand how a variable is a symbolic means of making changes to a algorithm in programming as well as math.

Standards: *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*

Mathematics K–12 Learning Standards: Number and operations-fractions 5.NF a : Interpret multiplication as scaling (resizing) by comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.

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Standards for Mathematical Practice:

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K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

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K-12 Science Standards

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Technology 1B-AP-09 Create programs that use variables to store and modify data. Variables are used to store and modify data.

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Engineering

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Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)
☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation
- x☐ Think Creatively
- x☐ Work Creatively with Others
- x☐ Implement Innovations

Critical Thinking and Problem Solving
- x☐ Reason Effectively
- ☐ Use Systems Thinking
- ☐ Make Judgments and Decisions
- x☐ Solve Problems

Communication and Collaboration
- x☐ Communicate Clearly
- x☐ Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy
- ☐ Access and Evaluate Information
- ☐ Use and manage Information

Media Literacy
- ☐ Analyze Media
- ☐ Create Media Products

Information, Communications and Technology (ICT Literacy)
- ☐ Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability
- x☐ Adapt to Change
- ☐ Be Flexible

Initiative and Self-Direction
- ☐ Manage Goals and Time
- ☐ Work Independently
- x☐ Be Self-Directed Learners

Social and Cross-Cultural
- x☐ Interact Effectively with Others
- x☐ Work Effectively in Diverse Teams

Productivity and Accountability
- x☐ Manage Projects
- x☐ Produce Results

Leadership and Responsibility
- ☐ Guide and Lead Others
- x☐ Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials White board and markers, blank sheet of paper, dice for each team.

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Set-Up Required: Explain to the students that they are going to play a dice game that will include algorithms and variables. Have the students' team up in pairs and give each team a blank piece of paper, a writing utensil, and one dice. Write a simple algorithm on the board, start out with a simple one, ex; 1+X=score. The algorithm that you start with can be grade/age appropriate. Explain that in this algorithm the X is the variable and it will change according to the number that they roll. Once each player has had 3 turns, they add up their scores to determine a winner.

The teams can play as many times as they wish or that you have time for.

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Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Cooperative Learning: Thinking creatively, working creatively with others, Reason effectively, make judgements and decisions, solve problems, communicate clearly, collaborate with others, use and manage information, adapt to change, be flexible, be self-directed learners, interact effectively with others, manage projects, produce results, guide and lead others, and be responsible to others

Expectations:

- Students are expected to work together, play fair, and explore the algorithms and how the changing variable effects the outcome of the game.

Timeline:

- 10-20 minutes

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- In real life we deal with variables all the time. When we get dressed in the morning our clothes can very according to the daily weather.

Career Applications

- Computer programming g or video game developer

Optional or Extension Activities

- For the second game tell the students that they can change their algorithms in any manor they wish, or add a second dice. Depending on the grade/age, students can use multiplication or subtraction with their algorithms in order change the outcome.

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Lab instructions: Variables dice game Names_____
_____

For this activity you will get with a partner and you will get one dice per team.

On a blank piece of paper, you will write down a mathematical algorithm, I will write your first one on the board. The X in the algorithm represents the number that you roll on the dice.

Take turns rolling the dice and write down your score on the score sheet below.

For game 2 change up your algorithm using different numbers, multiplication, or subtraction. Play as many times as you wish.

	First roll		second roll		third role		total
Player 1.	_____	+	_____	+	_____	=	_____
Player 2.	_____	+	_____	+	_____	=	_____

	First roll		second roll		third role		total
Player 1.	_____	+	_____	+	_____	=	_____
Player 2.	_____	+	_____	+	_____	=	_____

	First roll		second roll		third role		total
Player 1.	_____	+	_____	+	_____	=	_____
Player 2.	_____	+	_____	+	_____	=	_____

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Variable dice game assessment.

Once each team has played the game at least once, and hopefully more, have a whole class discussion about what they observed about how the variable (dice roll) determined the score, even though they were both using the same algorithm.