

Unit 5 - Iteration and Computer Simulation

Overview

In this unit, students will learn how to solve problems that require looping, also known as iterations. Students will learn several different ways to structure loops, and how iteration can be a valuable problem solving technique. Students will also gain experience modeling real world events through computer simulations that are implemented using loops.

21st Century Capacities: Synthesizing, Imagining

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

- MP 1** Make sense sense of problems and persevere in solving them
- MP4** Model with Mathematics
- MP5** Use appropriate tools strategically

Transfer:

Students will be able to independently use their learning in new situations to...

1. Model real world situations with software. (Synthesizing, Imagining)
2. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (Synthesizing)
3. Use appropriate tools to make reaching solutions more efficient, accessible and accurate. (Synthesizing)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Computer Scientists flexibly use different tools, strategies, and techniques to build conceptual knowledge or solve problems.
2. Computer Scientists apply the Computer Science they know to solve problems occurring in everyday life.
3. Computer Scientists create or use models to examine, describe, solve and/or make

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

- A. What is another way that this problem could be solved?
- B. What math tools/models/strategies can I use to solve the problem?
- C. What is the most efficient way to solve this problem?
- D. How do I model a real world situation with computer programming?

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	<p>predictions.</p> <p>4. Computer Scientists continually evaluate their process and the reasonableness of the intermediate results.</p>	
Acquisition:		
	<p><i>Students will know...</i></p> <ol style="list-style-type: none"> 1. What types of problems can be solved with iteration 2. The difference between pre- and post-test loops 3. How to calculate experimental probabilities using computer simulation 4. Vocabulary: loop, iteration, loop counter, For Next, Do While, infinite loop, experimental probability, nested loops, “off by one” (OBO) errors, lists 	<p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> 1. Writing For...Next loops 2. Writing Do...While loops 3. Writing For...Each loops 4. Modeling events with random numbers and loops