**Instructor: Kim Garcia**

**Subject Area:** Computer Science I

**Grade Level:** High School

**Overarching Theme:** Repetition occurs in our environment when events happen over and over again until a condition is met. Computer programs use repetition to solve a problem or simulate an event.

**Objective:**

1. Identify instances/examples of repetition in the real world.
2. Analyze classmates’ examples of repetition in the real world and discuss which type of loop best matches the example.
3. Design, code, and publish a computer program that simulates a real-world example of repetition.
4. Analyze classmates’ choice of loop structure and discuss suggestions to improve each other’s design and coding.

**Texas Essential Knowledge & Skills (TEKS):**

126.33 Computer Science I

c.4.F design a solution to a problem

c.4.G code a solution from a program design

**Lesson and Performance-based Assessment:**

1. **Introductory Activity**
   * Students will investigate instances of repetition in the real world and identify one example of real-world repetition that is similar to a loop in computer science to share with the class. They can search for websites or videos that provide examples. The following websites can be used for research and inspiration:
     + Designspiration image:  <http://designspiration.net/image/1187316946646/>
     + Morehouse STEM Do While and While Loop video: <https://www.youtube.com/watch?v=8868x41BU8U>
     + Mark Zuckerburg Teaches REPEAT LOOPS video: <https://www.youtube.com/watch?v=hYvcoRkAkOU>
     + Chris Bosh explains REPEAT UNTIL video:  <https://www.youtube.com/watch?v=jsUN0NV5RfQ>
     + Code.org's Getting Loopy Unplugged Activity: <https://code.org/curriculum/course1/12/Activity12-GettingLoopy.pdf>
2. **Discussion Activity**
   * Each student will post and describe an example of repetition in the real world that is similar to a loop in computer science.
   * Students will respond to their classmates’ posts and state whether they think the example described by the classmate is an example of a for loop, a while loop, or a do-while loop.
3. **Project (Performance Assessment)**
   * Each student will write a short computer program that simulates the example of repetition they described in their discussion board post. After learning more about repetition through other students’ posts, the student may choose to select a different repetition example to code, but the student may not choose an example posted by another student on the discussion board.
   * The student must determine whether the example is best represented by a for loop, a while loop, or a do-while loop. In the comments of the computer program, the student will describe why they selected this type of loop over the other two options.
   * After debugging the program and getting successful output, the student should upload his/her .java file in the assignment.
4. **Discussion Activity**
   * After the assignment submission deadline has passed, students reply to their original discussion board post and paste their repetition program for other students to view.
   * Students comment on each other’s coding choices. If a student thinks a classmate could have selected a different type of loop, the student advocates using positive language for why a different loop might have worked.

**Rubric: Computer Science Real-World Repetition Program & Discussion Board**

|  |
| --- |
|  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CATEGORY | **4** | **3** | **2** | **1** |
| **Discussion Board Post #1** | Posts one or more relevant examples of repetition in the real world and describes in detail how this is similar to a computer science loop. | Posts one relevant example of repetition in the real world and gives an adequate description of how this is similar to a computer science loop. | Posts one example of repetition in the real world. Example is loosely tied to a computer science loop. | Posts one example of repetition in the real world. No description is provided for how this relates to a computer science loop. |
| **Discussion Board Response #1** | Responds to one or more classmate's discussion board posts and states whether the example is a for loop, while loop, or do-while loop. Provides thorough rationale for statements. Uses positive language. | Responds to one classmate's discussion board posts and states whether the example is a for loop, while loop, or do-while loop. Provides adequate rationale for statements. Uses positive language. | Responds to one or more classmate's discussion board posts and states whether the example is a for loop, while loop, or do-while loop. Little rationale is provided for statements. Uses positive language. | Responds to one or more classmate's discussion board posts and states whether the example is a for loop, while loop, or do-while loop. No rationale is provided for statements. Uses challenging or negative language. |
| **Computer Program** | Computer program demonstrates how the real-world example could be coded. Program is error-free. Comments contain a detailed explanation of why the student selected the type of loop coded in the program. | Computer program demonstrates how the real-world example could be coded. Program is error-free. Comments contain an adequate explanation of why the student selected the type of loop coded in the program. | Computer program demonstrates how the real-world example could be coded. Program has one or more logic or syntax errors. Comments contain a loose explanation of why the student selected the type of loop coded in the program. | Computer program attempts to demonstrate how the real-world example could be coded. Program contains multiple logic or syntax errors. Comments are absent or contain very little explanation of why the student selected the type of loop coded in the program. |
| **Discussion Board Post #2** | Posts Java code for repetition example as a reply to student's original post on the class discussion board. |  |  | Posts Java code for repetition example on the class discussion board. Does not reply to original post. |
| **Discussion Board Response #2** | Responds to one or more classmate's discussion board post and comments on the student's coding choices. States agreement or disagreement with student's choice of coding a for loop, while loop, or do-while loop. Provides thorough rationale for statements. Uses positive language. | Responds to one classmate's discussion board post and comments on the student's coding choices. States agreement or disagreement with student's choice of coding a for loop, while loop, or do-while loop. Provides adequate rationale for statements. Uses positive language. | Responds to one classmate's discussion board post and comments on the student's coding choices. States agreement or disagreement with student's choice of coding a for loop, while loop, or do-while loop. Little rationale is provided for statements. Uses positive language. | Responds to one classmate's discussion board post and comments on the student's coding choices. States agreement or disagreement with student's choice of coding a for loop, while loop, or do-while loop. No rationale is provided for statements. Uses challenging or negative language. |