***Math-in-CTE Lesson Plan***

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| Lesson Title: **Conditional Statements** | Lesson # |

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| Occupational Area: **Computer Science** |
| CTE Concept(s): **Conditional Statements** |
| Math Concepts: **Functions and Piecewise Functions** |

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| Lesson Objective:Students will be able to write conditional statements to modify the flow of control in java programming |  |
| Supplies Needed:None |  |
| Link to Accompanying Materials: | http://sites.csn.edu/istewart/mathweb/Accuplacer/accu\_coll/pdf/piece.pdf |

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| **THE "7 ELEMENTS"** | **TEACHER NOTES**  **( Answer keys)** |
| 1. **Introduce the CTE lesson.**   How do you manage multiple potential scenarios within a program? Do all programs start at the top and go through every line? What if you only want to execute a statment in certain situations. |  |
| **2. Assess students’ math awareness as it relates to the CTE lesson.**  Evaluate: | A function is a process that can be applied to an input and produce an output. Functions have exactly one output per input. Piecewise functions are functions that define more than one function for a variable input.  Answer Key: For  , the output is 2(6)=12.  For , if the input is even, the returned output should be twice the input value. If the input is odd, the output should be equal to the input. If the input is zero, the function is not defined. |
| **3. Work through the math example *embedded* in the CTE lesson.** Write instructions to move a person to the exit of the room. Keep in mind that there might be other people walking around, there might be tables/desks/chairs that get moved etc. You need to be able to have the person check a “condition” and execute an appropriate “statement” | If a person is in front of you, wait for them to move. If a desk is in front of you, turn to the left. Etc |
| **4. Work through *related, contextual* math-in-CTE examples.**  Write Java instructions to calculate a letter grade based on a percentage score. | if (percent>=90)  grade=”a”;  else if (percent>=80 && percent<90)  grade = “b”;  else if (percent>=70 && percent<80)  grade = “c”;  else if (percent>=60 && percent <70)  grade = “d”;  else  grade = “f”; |
| **5. Work through *traditional math* examples.** | **NOTE:**  For the given function, if the input is less than zero, the returned output should be twice the input value. If the input is zero, the output is zero. If the input is greater than zero, the output is equal to half of the input.  For further discussion, functions may have repetition of output values. However, a function is not allowed to have varying output values for the same input value. |
| **6. Students demonstrate their understanding.**  Write Java instructions for assigning fines based on speeding tickets. If you were caught going <10 mph over the limit, the fine is $10 unless there is more than just the driver in the car, then the fine would be $15. If you were going 10-20mph over the limit, the fine is $20 unless there is more than just the driver in the car, then the fine would be $27. If you were going >20mph over the limit, the fine is $100 unless there is more than just the driver in the car, then the fine would be $200. | if (speed<limit+10)  if(passengers>1)  fine = 15;  else  fine = 10;  else if (speed<=limit+20&&speed>=limit+10)  if(passengers>1)  fine = 27;  else  fine = 20;  if (speed>limit+20)  if(passengers>1)  fine = 200;  else  fine = 100; |
| **7. Formal assessment.**  Write a program that takes input from a user. The user should input their total income. The program needs to output the amount of federal income tax the person owes. Use the [Federal Income Tax Tables](http://www.bankrate.com/finance/taxes/tax-brackets.aspx) as your guide. |  |

***Further Resources***

<https://docs.oracle.com/javase/tutorial/java/nutsandbolts/op2.html>

<https://docs.oracle.com/javase/tutorial/java/nutsandbolts/if.html>

https://studio.code.org/unplugged/unplug6.pdf