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NSF GK-12 Vibes and Waves in Action

AP Environmental Science

Summary of lesson

This lesson is intended to provide the students with a review of what we covered before winter vacation. Having not seen any code for the past several weeks, an extensive review was needed to ensure that everyone starts the new semester on the same page. The review topics ranged from operators that were covered (assignment operator and mathematical operators), to evaluating mathematical expressions and using functions. After an in class discussion, the students were given a worksheet to complete that would demonstrate understanding of these topics.

AP Environmental Science Lesson Plan

Objectives: Review the most important concepts covered before winter vacation.

Frameworks: Math: N-Q, A-all, A-SSE, A-APR, A-CED, A-REI, F-IF, F-LE. Inquiry: SIS1, SIS2, SIS3, SIS4

L-Side Activities: Teacher	R-Side Notes: Students
<p>At the bell: Think-Pair-Share: What is the assignment operator? Why do we use it? Using the following vocabulary words "Variable" and "Value", what is the syntax of the assignment operator?</p> <p>Agenda:</p> <ol style="list-style-type: none"> 1. Operators 2. Mathematical Equations 3. Functions 4. Variables 	<ol style="list-style-type: none"> 1. Operators <ol style="list-style-type: none"> 1. Review assignment operator 2. Addition / Subtraction / Multiplication / Division 2. Mathematical Equations <ol style="list-style-type: none"> 1. Relationship with a calculator 2. PEMDAS 3. The importance of parentheses 4. How to implement (most) of PEMDAS in R 3. Functions <ol style="list-style-type: none"> 1. Mathematical functions ($y = f(x)$) 2. Input arguments vs. output parameters 3. Exponents and logarithms 4. Special function: plot 4. Variables <ol style="list-style-type: none"> 1. Using the output parameter of one function as the input argument of another 5. Extra Credit <ol style="list-style-type: none"> 1. Previous assignment

Mathematical Operations Worksheet

AP Environmental Science – 1/16/14

The goal of this lesson is to familiarize you with how to use the R programming language to perform all of the basic mathematical operations. Implement the following statements in R using:

The assignment operator:

<-

The addition, subtraction, multiplication, division and exponent operators:

+, -, *, / and ^

The exponential and natural log functions:

exp(), log()

Parenthesis:

()

$$a = 2 + 2$$

$$b = 1,000,000 - 958,213$$

$$c = 99 * 99$$

$$d = \frac{121}{11}$$

e is intentionally omitted due to its

extensive use in mathematics

$$f = \frac{4}{5} * \frac{2}{3}$$

$$g = 2 * \left(4 + \frac{2}{3}\right) * 5$$

$$h = \frac{5 + 4 + 3 + 2 + 1}{10 + 8 + 6 + 4 + 2}$$

$$i = \frac{12 * 3}{2 * (8 + 4)}$$

$$j = 2^3$$

$$k = 5 * 3^4$$

$$l = 5^5 + 6^6$$

$$m = \frac{(10 + 3 * 4)^3}{(8 * 10)^2}$$

$$n = e^3$$

$$o = \ln(5)$$

$$p = e^{\frac{4+3}{(2+4)^2}}$$

$$q = a + b$$

$$r = f * d$$

$$s = \frac{g + h}{r}$$

$$t = e^{(1+i)^2}$$

$$u = \frac{a + b^2}{b}$$

$$v = \frac{8}{a + b} + \frac{c + d}{e^2}$$

$$w = \ln\left(\frac{h + k}{l + c}\right)$$

$$x = (a + b) * c$$

$$y = \frac{l}{k} * \frac{m}{n}$$

$$z = \ln(e)$$

Submission: After obtaining values for a through z, save your work as follows:

`save.image("Name.RData")` . Then, email a copy of this file to Ms. Leonard for evaluation.