

COMPUTATIONAL MODEL DIRECTIONS

EXPLORE 1 LESSON 16



Instructions for Creating Computational Model of Biodiversity

Utilize these tips to create a computational model in the Lesson 16 Plant and Animal Counts in Different Fields Spreadsheet. You will use a measure of biodiversity called the Simpson's Biodiversity Index. The formula that calculates this index is shown below:

$$D = 1 - \left(\frac{\sum n(n-1)}{N(N-1)} \right)$$

In this equation...

- D = Simpson's Biodiversity Index
- n = the number of individuals of a specific species
- N = the total number of organisms of all species
- Σ = the sum of

As you can see, the formula would be quite complex to calculate by hand! So, you will create a computational model of the formula to have a spreadsheet app to do the calculation for you. Follow the steps below to build the computational model.

1. Review the image of the Monoculture Crop field. Name all the organisms you see on the image and count the total of each organism for each area.
2. Open the Lesson 16 Plant & Animal Counts in Different Fields Spreadsheet open the Monoculture Crops sheet tab (you can find the tabs at the bottom of excel screen).
3. On this sheet, you will see the same variables that are indicated above in the Simpson's Biodiversity Index formula.
4. You can use the spreadsheet functions shown below to build the computational model.
 - a. Note that the examples shown are only examples to show how each function is built. These specific formulas are not used in the task. You should come up with your own specific formulas using these functions to build the Simpson's Diversity Index equation.

Copy the Values in a Cell	Add Two Cells	Subtract Two Cells	Add Values to a Cell
In the formula bar, type in =(Cell name).	In the formula bar, type in =(Cell name + Cell name).	In the formula bar, type in =(Cell name - Cell name).	In the formula bar, type in =(Cell name + Number).
For example, for cell F1, type			

=(F1)	For example, to add cell A2 and C3, type =(A2+ C3)	For example, to add cell A2 and C3, type =(A2+ C3)	For example, to add 10 to cell B4, type =(B4 + 10)
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Subtract Values from a Cell	Multiply Two Cells	Divide Two Cells	Sum the Values in Multiple Cells
<p>In the formula bar, type in =(Cell name - Number).</p> <p>For example, to subtract 10 from cell B4, type =(B4 - 10)</p>	<p>In the formula bar, type in =(Cell name * Cell name).</p> <p>For example, to multiply cell A1 and B1, type =(A1* B1)</p>	<p>In the formula bar, type in =(Cell name / Cell name).</p> <p>For example, to divide cell C2 and C3, type =(C2/ C3)</p>	<p>In the formula bar, type in =(SUM). A prompt will come up to enter the two cells that are at the ends of the range of what you want to select. Type in those cell names with a colon between them.</p> <p>For example, to sum cells F1 to F10 type =SUM(F1:F10).</p>

Combination Functions

You can also create combinations of functions by putting the functions in the table above together.

For example, if you want to multiply the sum of a series of numbers from A1 to A15 by 100, you would type:

= 100 * SUM(A1:A15)

In another example, you could subtract a value in cell B4 from the multiplied value of two other cells, A2 and D2. Use parentheses to make sure the function happens first that you intend. To do so, you would type:

= (A2*D2) - B4

Calculating an Average Across Tabs

You can use a spreadsheet function to call on values in cells on different tabs.

For example, if you want to take the average of values in cells A10 on three different tabs, you would type:

= AVERAGE (

Then navigate to the tab that has the cell you want to choose and click the cell. Repeat this process for the cells on additional tabs, then return to the Average tab and press Enter.

5. Build the spreadsheet for the sampling site that you were assigned. Share it with another student group who had the same sample site. Revise your spreadsheet as needed.