

Tasks	Notes/Hints	Questions
1 Save your document	Use the file naming convention: SL 1 - Last F	
2 Freeze panes and adjust column sizes	Select row 3 » View » Freeze Panes » Freeze Panes	
3 Scroll through the data to get a feel for it. Look at the column headings, the kinds of values given, etc.		What stands out to you? What do you notice?
4 Make a copy of the raw data so that you can always come back to it if necessary.	Right-click on tab » Move or Copy... » Create a copy » OK Then rename the new tab.	
5 Filter and sort to identify and eliminate "bad data"/outliers.	Highlight row 2 » CTRL + SHIFT + down arrow » Home » Sort & Filter » Filter	What exactly are you deleting? For example, "all Wind Speeds below ____" Include justification for each elimination.
6 Set up a new "stats" tab: column headings along top, descriptive statistics along left  For each relevant parameter, calculate: -- Mean -- Standard deviation -- 5-number summary (min, Q1, Q2, Q3, max)	<p>Use: AVERAGE, STDEV. ___, MIN, QUARTILE. ___, MAX</p> <p><b>Iterate</b> your formulas. Once you've entered a formula (or a range of formulas), hover over the bottom right corner (you should see a little black +), and click-and-drag to extend the formula to other cells, or double-click to have Excel do it automatically.</p> <p><i>Tip for making calculations:</i> Start every calculation in a cell by typing an equal sign (=). That tells Excel that you want it to do something. Then you can type the name of the function you want to use or start entering your own formula. Whenever you want to use the values from other cells, click on those cells when you're typing your formula.</p> <p><i>Tip for using built-in functions:</i> To auto-complete the name of a function when you see it highlighted, use the TAB key.</p> <p><i>Tip for calculating quartiles:</i> After selecting your data, finish typing the rest of the QUARTILE formula <u>without switching tabs</u>.</p>	How are DO, turbidity, temperature, wind speed, and chlorophyll related to productivity? What (if anything) do your results for those parameters tell you about primary productivity?
7 Choose one of the following parameters and create a graph that shows the parameter over time.  <i>Parameter choices:</i> -- DO -- turbidity -- temperature -- wind speed	To get a quick graph, select the column you want for your x-axis, hold CTRL and select the column you want for your y-axis, then insert the appropriate type of graph. Edit from there.	Based on the graph, do you believe there are any outliers you missed earlier? If so, do you think they should be removed from the dataset? Why or why not? (Record and remove as justified.)
8 Adjust the x-axis of your graph to remove extra space at the beginning and end.  Move your graph to the "Graphs" tab and respond to the question.	To find the minimum and maximum x-values for your graph, type the dates 1/1/2019 and 1/1/2020 into two empty cells, and then have Excel display them as <i>numbers</i> instead of dates.	Use your graph to <i>predict the bloom</i> — when do you think that plankton biomass was the highest in 2019? Lowest? Justify your predictions.

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9 Create a MONTH column that stores only the month of each date. <i>Optional Challenge:</i> Split each month into two halves and store 1.0, 1.5, 2.0, 2.5, etc.	<p>Once again, you should create a formula and <b>iterate!</b> Use the MONTH function.</p> <p><i>Tip:</i> Putting a '\$' in front of any row number of column letter locks that row or column when iterating. Use that idea here to be able to fully take advantage of iterating.</p> <p><i>For the optional challenge, you will need to find a way to use some other functions, too. One possibility is to use the DAY and IF functions.</i></p>	
10 In a new tab, calculate monthly (or bi-monthly) means of all relevant parameters. Make sure to include chlorophyll.	Use AVERAGEIF or AVERAGEIFS commands, and again, make sure to <b>iterate</b> .	
11 Use conditional formatting to add a color scale to each parameter.	You can use the "format painter" to extend the color scale formatting to more columns.	What do you see!? How close was your prediction compared to the patterns observed in the chlorophyll data? Knowing what triggers plankton blooms, can you make sense of the local seasonal trends? What other information or data might help you to interpret the patterns?
12 <i>Optional Bonus:</i> Display your monthly/bi-monthly results in a graph that demonstrates the relationship (or lack-thereof) between chlorophyll and the parameter you chose for your first graph. Move your graph to the "Graphs" tab.		

#### Exploring Marine Primary Productivity with Descriptive Statistics and Graphing in Excel

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