**Bob the Glider Quick Guide**

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| **Engage and Explain**  *(10min)* | Ask students what is up with Bob?  Ask students if they know what an anomaly in data is?  Ask student if they know what an ocean glider is or if they have hear of an array? | |
| Teacher does: | Students do: | Sharing Strategies and Questions |
| Tell students Bob is an ocean glider and recently got back to short.  Their data came back with an anomaly and we have to look for it and come up with an explanation.  Tell students that Bob’s data travels from the ocean into the array of sensors and then all over the world for researchers to use! | Students watch:  [<https://oceanservice.noaa.gov/facts/ocean-gliders.html>](https://oceanservice.noaa.gov/facts/ocean-gliders.html)  Students can also explore to see where Bob works:  <https://youtu.be/vLWoDVfzNSY>  Students see the connections between Bob, the Array, and other sensor arrays around the world  Students look at the sawtooth pattern image | Have students pair up and explore the media resources in groups or as a class.  Ask students, based on the saw tooth image – how might a graph of the gliders path look? |

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| **Explore 1**  *(10-15min)* | What charts do you see that can tell us what data Bob was collecting?  What words do you notice about the ocean? | |
| Teacher does: | Students do: | Sharing Strategies and Questions |
| Tell students that one strategy to make sense of a lot of data is to look at meta data.  Tell students that this will tell us how Bob’s data is organized before we look at it in google sheets. | Teacher or students can load up the .csv to data basic or use the provided slides as handouts or as a class discussion.  <https://databasic.io/en/wtfcsv/>  Students and teacher can go to the titles and then graph by graph | Have students how man rows and columns are in the data sheet.  Ask students what each graph is about by looking at the title?  Ask students if anything looks odd or stands out to them?  (the anomaly is most visible in the graphs)  You can make a list or have students make and post sticky notes of what they are seeing to reference later |

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| **Explore 2**  *(10-15min)* | Tell students that the glider goes up and down in the water collecting data in that sawtooth pattern and we should see a trend. As the glider gets deeper pressure on the glider goes up, as the water gets colder, denser, and saltier.  Tell them to keep looking for the anomaly. | |
| Teacher does: | Students do: | Sharing Strategies and Questions |
| Imports the excel spreadsheet to google sheets or uses the provided graphs  Make graphs using the insert chart function.  Time goes on x-axis  Copy and paste a set of coordinates into google maps  [Explore the full map data](https://www.google.com/maps/d/u/0/edit?mid=1wNbC0utyqLEERbbi-opJtU0-gCli99g&usp=sharing)  [Here](https://www.google.com/maps/d/u/0/edit?mid=1wNbC0utyqLEERbbi-opJtU0-gCli99g&usp=sharing) | Make and or explore the graphs using the insert function of google sheets for depth, feet, salinity, and pressure  Copy and paste a set of coordinates into google maps  Explore the GPS data in Maps here  [Explore the full map data](https://www.google.com/maps/d/u/0/edit?mid=1wNbC0utyqLEERbbi-opJtU0-gCli99g&usp=sharing)  [Here](https://www.google.com/maps/d/u/0/edit?mid=1wNbC0utyqLEERbbi-opJtU0-gCli99g&usp=sharing)  Students can import the excel sheet to maps or link to the google sheet and make their own MAP to explore | Ask students what patterns do you see?  Ask students, where do you think the anomaly?  Ask students, what data was lost and what was still working?  On the map ask, what happened to the glider when it “moved” from one spot to the other on the map and we lost data?  Ask students what may have happened to the glider? |

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| **Elaborate and Evaluate**  *(15min)* | Tell students that they are going to see where Bob is using one of the data portals scientists use.  Connect Bob to the glider, to the array, to the data portal that they are using.  Tell them that RV Taani is going to make data that will live stream to a portal like Bob did. | |
| Teacher does: | Students do: | Sharing Strategies and Questions |
| Directs students to NVS Nanoos Data Explorer  <http://nvs.nanoos.org/>  Turn-off all platforms one by one  Turn-on retired platforms  Highlight Bob using the drop down + button  Connect Bob to the glider, to the array, to the data portal that they are using.  Watch Data Video  [RCRV Data Video here!](https://drive.google.com/file/d/1J9R8fBbeKgeRndUT8l9k6_2nz93YUgkX/view?usp=sharing) | Have students see where Bob is on the data explorer  Find when the last time Bob uploaded data was  Find the coordinates they thought Bob was at earlier in the activity is where Bob is at  Watch video and see how data is created by Research Vessels and uploaded to portals, just like Bobs is!  Watch Data Video  [RCRV Data Video here!](https://drive.google.com/file/d/1J9R8fBbeKgeRndUT8l9k6_2nz93YUgkX/view?usp=sharing) | Have students use and interact with the data portal while the teacher navigates it in front of the class  Teacher can also project data portal then let students explore after  Ask students, what do you think a data portal like this could be used for? Who would use it and why?  Lets students know that each array they saw earlier has its OWN data portal and that they are living in a time of really rich data provided by these scientific tools! |