

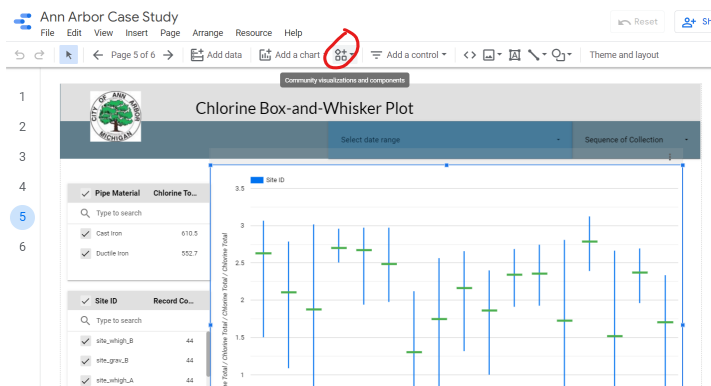
Link to the [Ann Arbor Google Data Studio](#) (GDS)

GOAL:

Create a module that can be shared among water treatment facility workers, and analysis can be shared among companies. It should include interactable charts that provide interesting insights for those familiar with the industry.

COMPONENTS:

1. Intro Page - fluff text that explains purpose and components of the module. Includes links and authorships.
2. Tutorial - gives a brief overview of how to navigate and use GDS to its fullest potential
 - a. This page was copied from the actual GDS tutorial and slightly modified
3. Data
 - a. Google Sheets connected to the GDS, continually updated when Google Sheets updated
4. Charts
 - a. Scatterplots
 - b. Box & whiskers - this is a custom graph from the community. Can be found here:



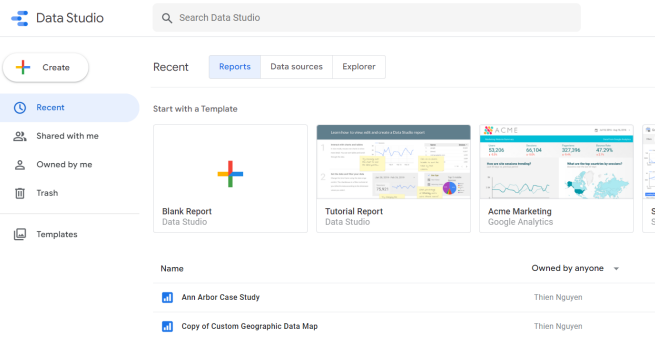
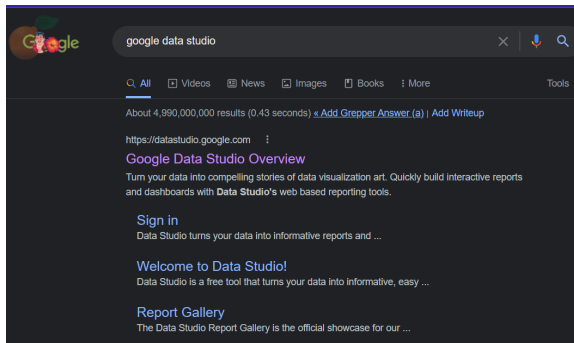
- c. Geospatial graph - requires address or coordinate data.
5. Edit / View mode in the top right corner as a big blue button.

How does GDS work?

As I was making the GDS module, I ran into a lot of minor, but frustrating hindrances. Here's what I learned:

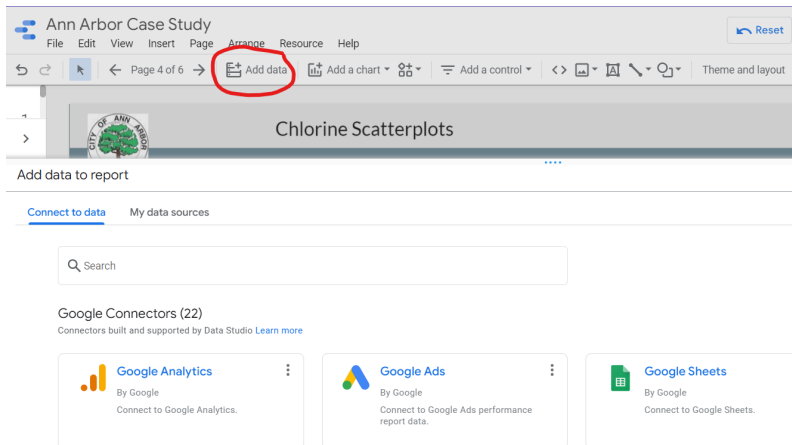
Sharing:

Each GDS is pretty much like a Google Doc. You can share, copy links, copy an entire GDS, and it's linked to your Google Drive account. Unfortunately, as of right now, it does not show up in your gDrive. You have to look up "google data studio" and go into the GDS-specific website.

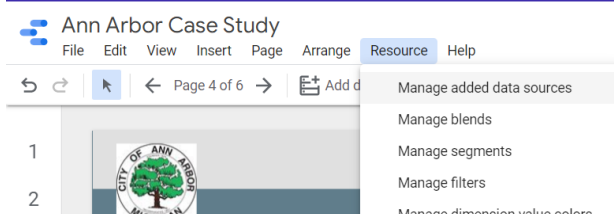


Data:

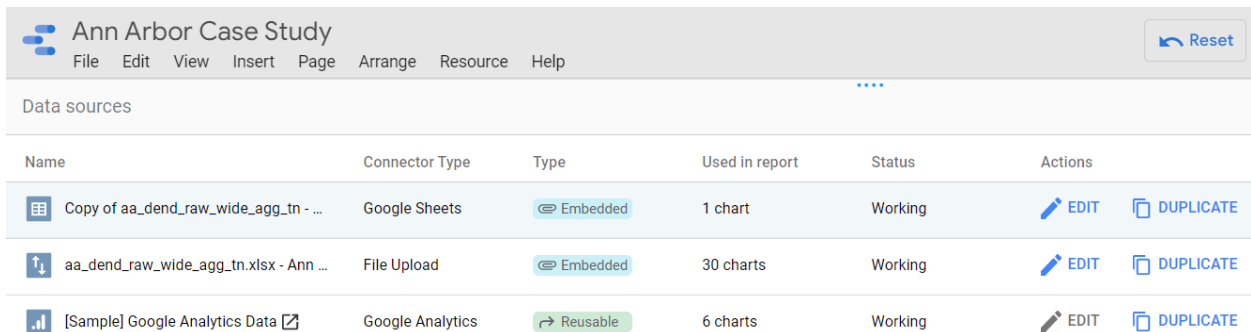
Thanks to Google being nice, you can link your data to Google Sheets in your gDrive. Your data has to be a *Google Sheets* file. Click the "Add data" button on the top toolbar.



Once added, you can edit them by going to the top toolbar and clicking **Resource** → **Manage added Data Sources**.



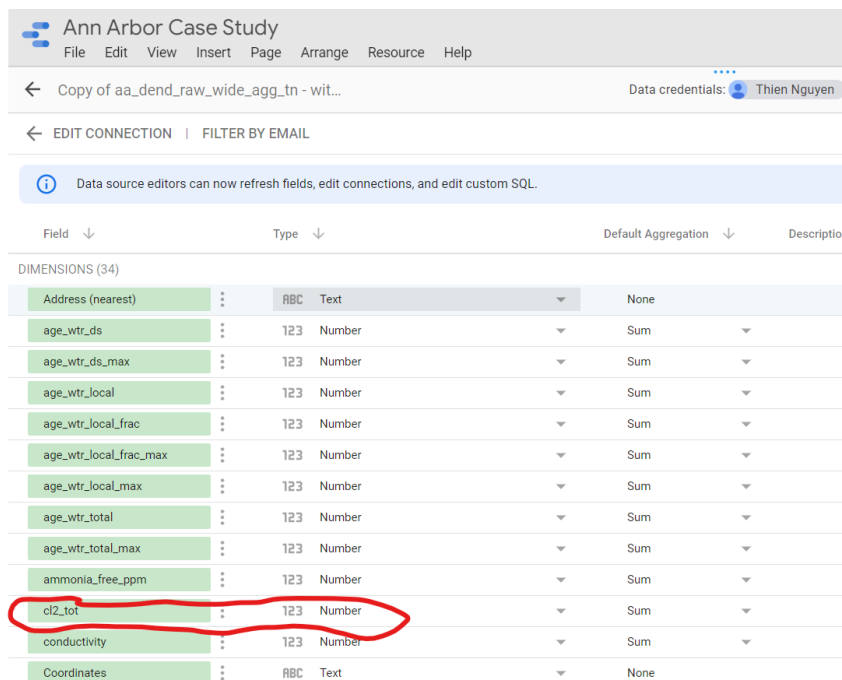
Important Note: After you've connected your gSheets, you will most definitely need to edit how GDS sees some of the parameters, and probably rename the parameters to be more user-friendly.



The screenshot shows the 'Ann Arbor Case Study' dashboard with a menu bar (File, Edit, View, Insert, Page, Arrange, Resource, Help) and a 'Reset' button. Below the menu is a 'Data sources' section containing a table with the following data:

Name	Connector Type	Type	Used in report	Status	Actions
Copy of aa_dend_raw_wide_agg_tn - ...	Google Sheets	Embedded	1 chart	Working	EDIT, DUPLICATE
aa_dend_raw_wide_agg_tn.xlsx - Ann ...	File Upload	Embedded	30 charts	Working	EDIT, DUPLICATE
[Sample] Google Analytics Data	Google Analytics	Reusable	6 charts	Working	EDIT, DUPLICATE

Click edit under “Actions” and scroll through your data.



The screenshot shows the 'Ann Arbor Case Study' dashboard with a menu bar (File, Edit, View, Insert, Page, Arrange, Resource, Help) and a 'Reset' button. Below the menu is a 'Data sources' section containing a table with the following data:

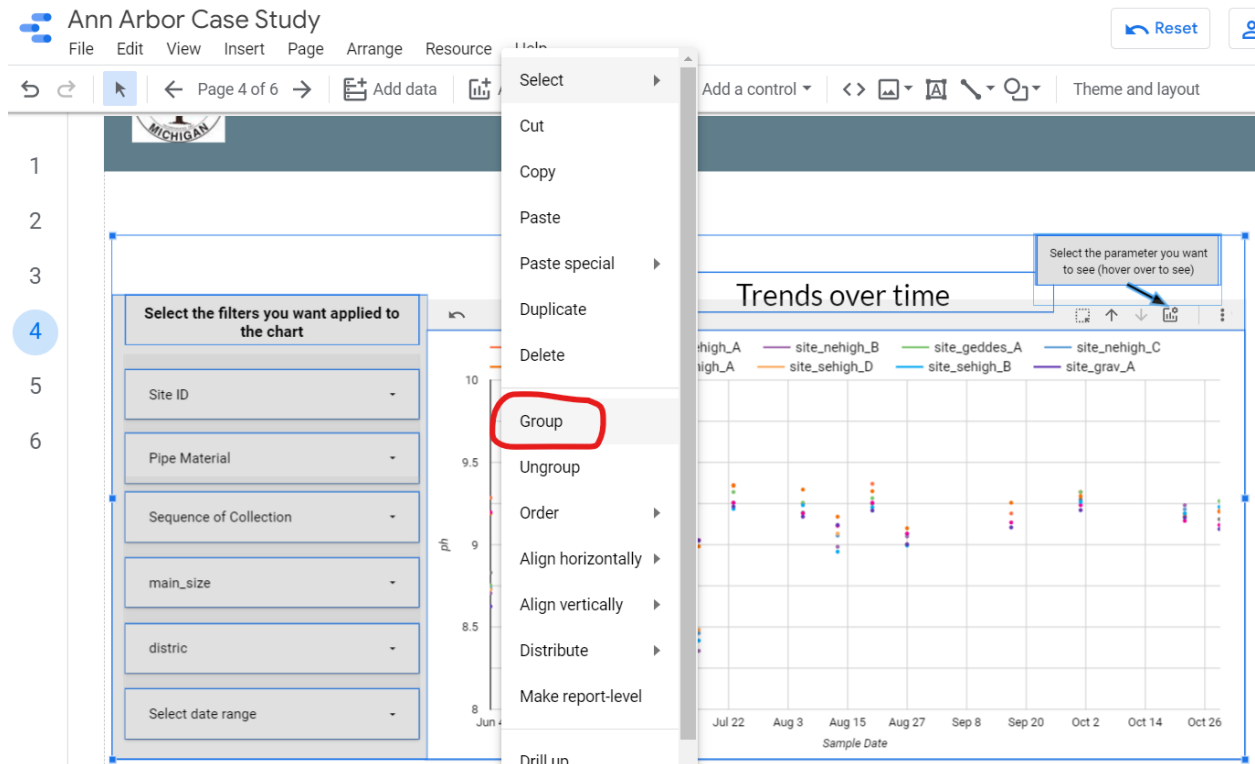
Field	Type	Default Aggregation	Description
DIMENSIONS (34)			
Address (nearest)	ABC Text	None	
age_wtr_ds	123 Number	Sum	
age_wtr_ds_max	123 Number	Sum	
age_wtr_local	123 Number	Sum	
age_wtr_local_frac	123 Number	Sum	
age_wtr_local_frac_max	123 Number	Sum	
age_wtr_local_max	123 Number	Sum	
age_wtr_total	123 Number	Sum	
age_wtr_total_max	123 Number	Sum	
ammonia_free_ppm	123 Number	Sum	
cl2_tot	123 Number	Sum	
conductivity	123 Number	Sum	
Coordinates	ABC Text	None	

Look at **cl2_tot**. Originally, that was seen as an **ABC Text**. This happened pretty often to me, so be prepared to go into the data source and manually change how these datapoints are viewed by GDS. If you have trouble while editing graphs and the data isn't given the options you want, ensure that it is being processed correctly. The default aggregation is usually Sum or none, depending on what you need it to do.

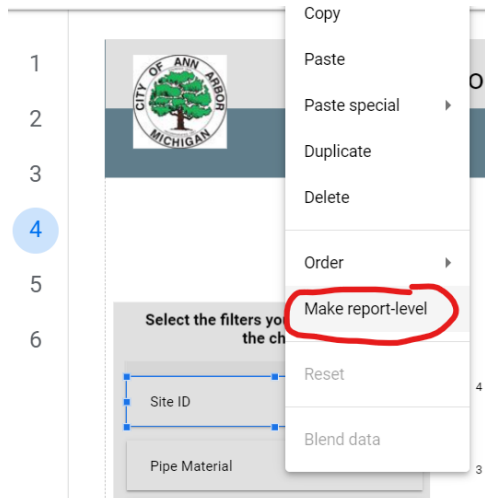
Influence Levels:

Similar to Google Slides or PowerPoint, a GDS is separated into pages. You fill each page with a layout (which I just copied and pasted from free GDS templates I found online), some charts, and some controls to manipulate those charts. When you edit a page's layout with shapes or lines, or when you add in a control element, you can choose how much that layout/control is able to influence. There are three levels:

1. **GROUP** - after getting all your elements on the page, select everything you want to group together, left click, and select “**Group**”. Now, the control elements will only affect graphs within its group.

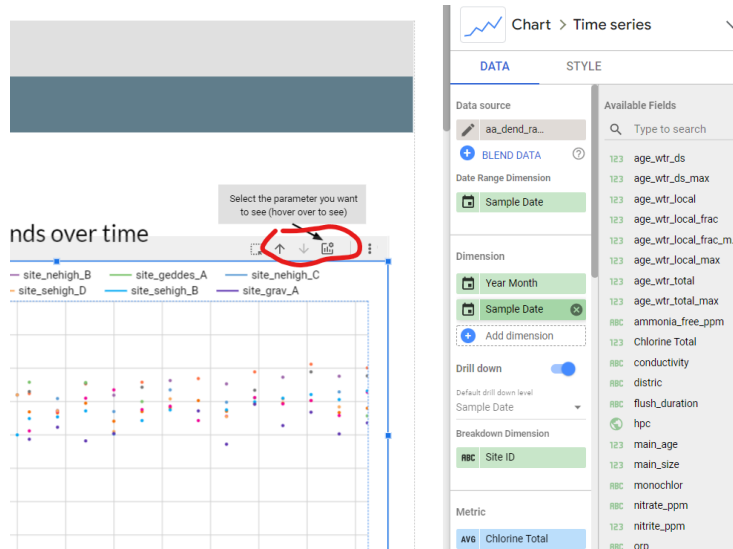


2. **PAGE** (default for controls) - When you first add controls to a page, they will affect all charts on that page by default.
3. **REPORT** (default for layouts) - You can right click an individual control to “**Make report level**”, which means it will influence all pages and all charts.



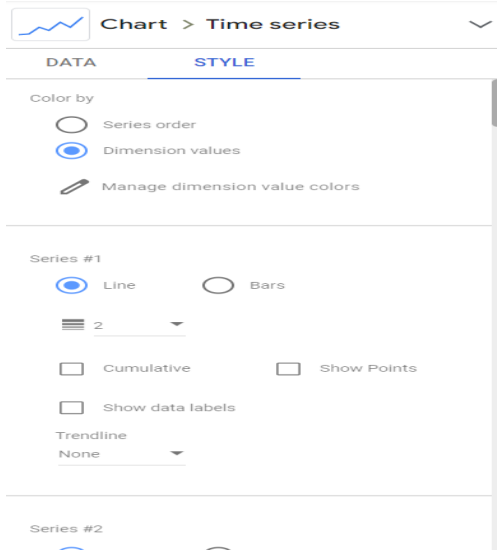
Charts - Time Series:

There are many standard charts and geospatial maps that GDS offers. Here's a quick rundown on how they work:



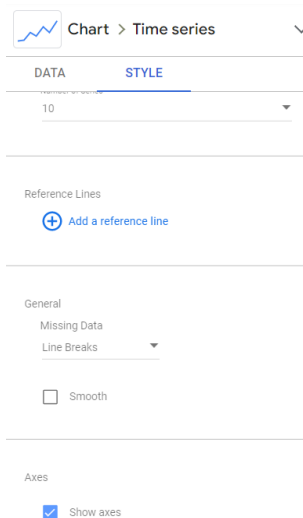
1. Select the chart you've added to the page
2. Most of them come with a Date Range dimension. Sample Date will work 95% for this
3. Turn on "**Drill Down**" and the Year Month field will automatically add itself. This is the X-Axis, most of the time.
 - a. Here's what drilling down means for GDS
 - b. Drill up or down with the arrows in the red circle
4. "**Breakdown Dimension**" will be the distinguishing characteristic between plots of the same type, it just splits up the data into colors on the chart.
5. "**Metric**" and "**Optional Metrics**" are the Y-Axis. Turn on "**Optional Metrics**" after scrolling down a bit. You can add thru search or by dragging and dropping the right-side fields into open slots.
 - a. In the right-hand, gray-background column of all the data fields, you can see how GDS is interpreting that particular data field.
 - b. I recommend setting these as AVERAGES
6. The rest of the options you don't really need to worry about

Next up on the right-side menus when editing a graph is under the "**STYLE**" section. In there, there are a bunch of series (mostly, you only need to worry about Series #1 & #2) that you can add trendlines to and change how they're displayed.

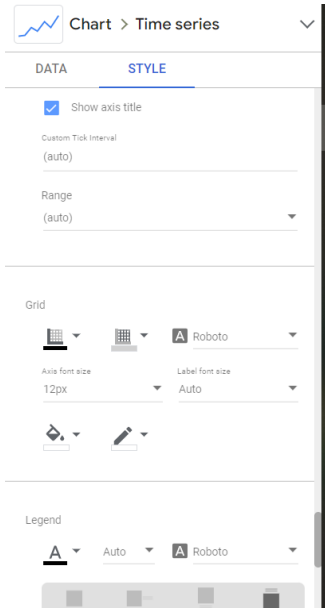


The **most useful things** I found from this section is:

1. Scroll down almost to the bottom, in the section *General*. **“Missing Data”** pretty much determines whether or not the chart has lines connecting all the data points.



2. Scroll a little further down, under **“Grid”**. If you’re having trouble with the data labels / axis titles not showing up, and it’s just ellipses, then make the Axis Font Size smaller.



Charts - Google Maps:

“**Location**” should be the field that has either an address or coordinates. “**Tooltip**” determines what data shows up when you hover your cursor over a circle on the map. “**Size**” and “**Color Metric**” influence the size and color gradient of the data circles on the map.

Chart > Google Maps

DATA | **STYLE**

Data source: Copy of aa...
 BLEND DATA
 Date Range Dimension: Sample_Date

Fields: Location: Coordinates

Tooltip: pipemat

Size: ci2_tot

Color metric: nitrite_ppm

Default date range: Auto

Available Fields

Type	Field Name
HBC	Address (nearest)
123	age_wtr_ds
123	age_wtr_ds_max
123	age_wtr_local
123	age_wtr_local_frac
123	age_wtr_local_frac
123	age_wtr_local_max
123	age_wtr_local_max
123	age_wtr_total
123	age_wtr_total_max
123	ammonia_free_ppm
123	ci2_tot
123	conductivity
HBC	Coordinates
HBC	distric
123	flush_duration
HBC	Flush_Type2
hpc	hpc
123	main_age
HBC	main_mat
123	main_size

ADD A FIELD
 ADD A PARAMETER