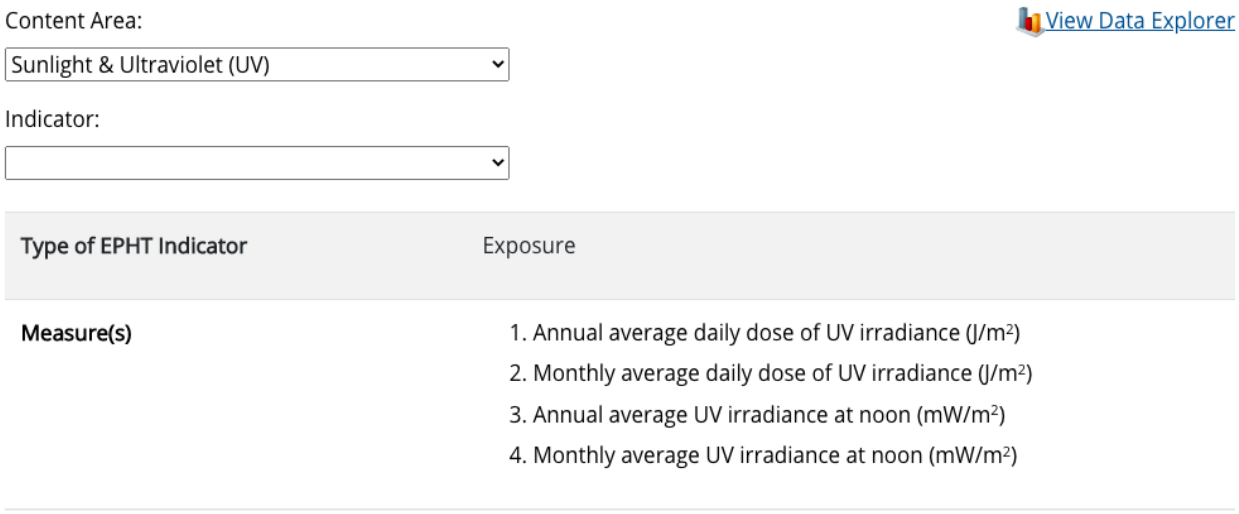
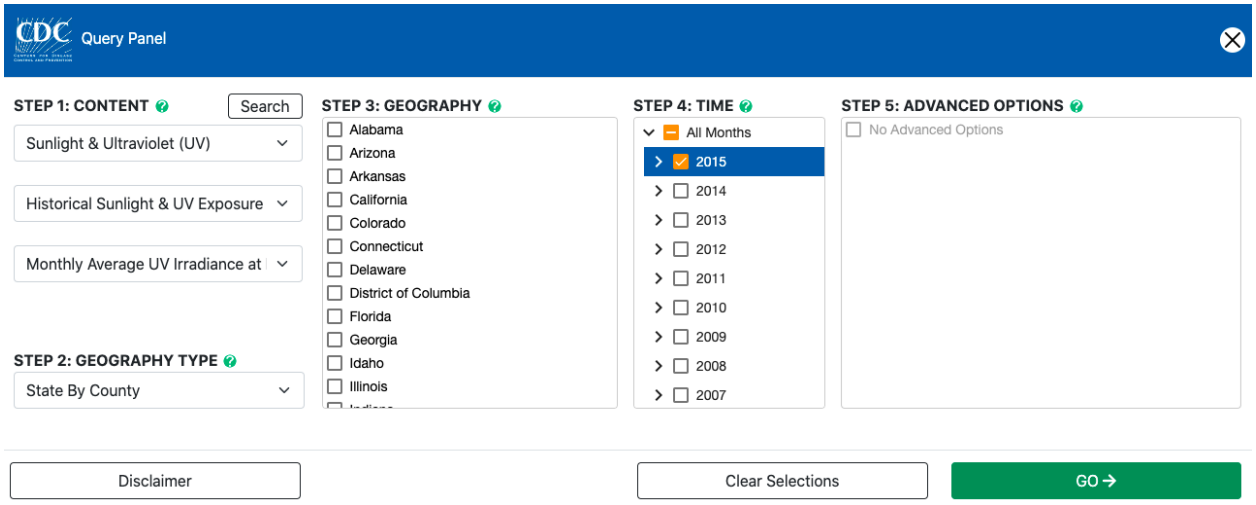
Data Title - Sunlight and UV Exposure in New York State
Link to Data Set

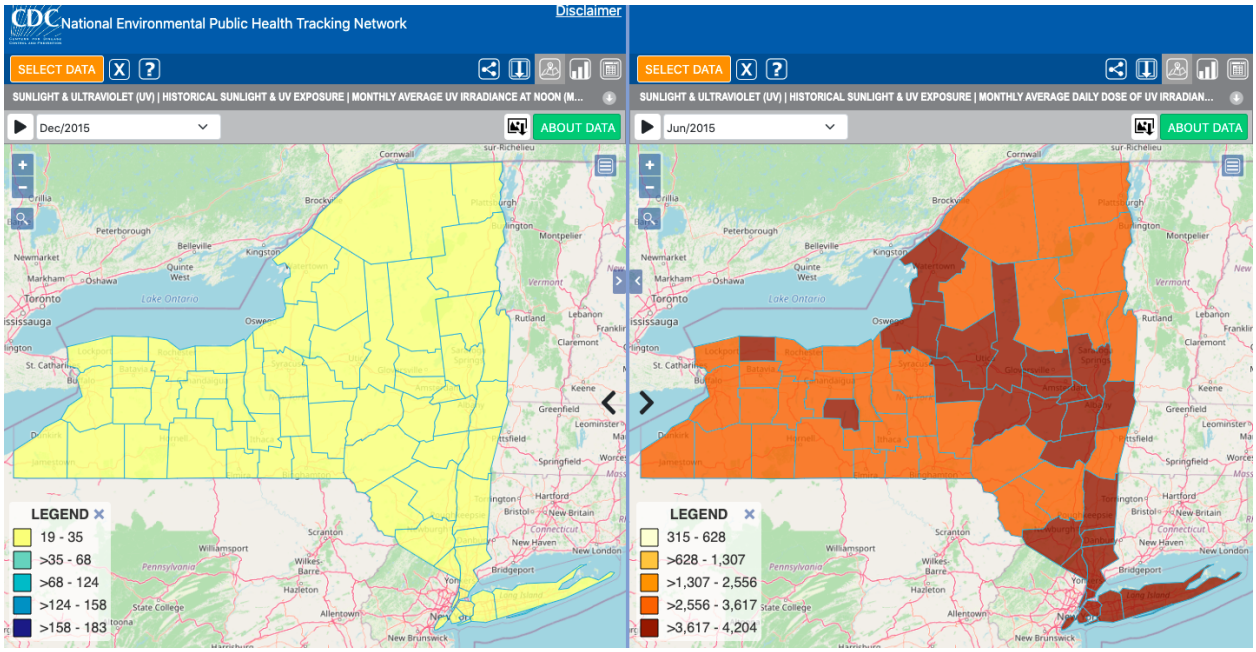
For this assignment, I wanted to find data related to electromagnetic radiation. This past year, students learned how to use information from the electromagnetic spectrum (like wavelength and frequency) to solve for wave speed. This was towards the end of the year, so we did not have a ton of time to understand electromagnetic radiation in a real life setting or context. I found some resources on the CDC's website on public health data with respect to environmental factors such as air quality, pesticide exposure, and precipitation. Once you specify a given environmental factor, you can view a heat map for this given environmental factor in different states or counties. The environmental factor I was interested in was UV radiation. Not only does the intro page given a brief description of what UV radiation is, it also spells out all the parameters of the interactive data set (shown below):



Once you open the geographic map, you select the environmental factor, and the unit of measurement you want to use (listed above)



For this assignment, I decided to look at a simple, somewhat intuitive fact regarding UV radiation: there's more UV radiation, at noon, in June, compared to January in New York State.



The heat map clearly shows this reality, and that's a benefit to using this data visualization tool. It taps into one's intuition regarding UV radiation which makes it easier to look at other factors as well. I'm thinking about Tran & Doughtery's (2014) Authenticity of Mathematical Modeling and the components of an authentic task. I'm wondering if I can make some task where students are given a claim, and based off the CDC data, they have to evaluate and assess the claim's accuracy. For example, a claim could be: "New York Residents should only wear sunscreen in

the summer months.” In order to assess this claim, students would need to know what amount of UV radiation is harmful to human skin. Once they make this judgment, they could use the heat maps to see in what months one needs to wear sunscreen. Through this activity, it is likely that students will identify that they need additional information. For example, this data set does not take exposure time into consideration, only monthly average UV irradiance at noon.

In addition to this heat map, there’s an option for the user to look at the same data as a bar graph, as well as a data table. These multiple representations of data are extremely valuable for students to be able to see and go back and forth between. Data is so important for students to use, but in my opinion, its equally as important for students to see and use these multiple representations.For example, if a student can represent an object’s position and time in a data table, they should be able to translate this data into a graph, and ultimately into an equation. This equation can allow them to predict an object’s position at a later time that they might not have directly measured. Equations allow us to make these types of predictions. Moreover, having multiple representations at our disposal allows the user/viewer to decide which representation is more useful for the given time. While having the monthly average UV irradiance in a data table is helpful, having this translated into a heat map is a much clearer way for presenting the same information.

This specific data set/resource has a number of interdisciplinary connections to AP Environmental Science, Urban Agriculture, and Building Science. For example, one can view rates of asthma and concentrations of selected air pollutants across different states and counties in a given state. This type of data easily allows for discussions around health inequity, urban planning, and equitable solutions. I plan on talking with the Urban Agriculture and Building Science teachers at my school to see how we can use and implement these data resources in the fall.