

WEATHER DATA POSTER FURTHER ENGAGEMENT

There are lots of ways to engage your students with this data visualization about weather data in Missouri. Explore all or some of the ways noted below. You can do them all as part of a larger project, pick and choose what works for you, or come up with your own ideas for how to incorporate weather data into your classroom.

While looking at the weather data visualization poster itself:

- Discuss the questions on the poster with your students. You could create a visual with their answers (chart, word web, pictogram etc.)
 - ◇ These questions might seem simple but they are key data science questions that start the discovery and critical thinking process all data scientists use to analyze data sets and data visualizations.
 - ◇ Blurb on poster: This weather data visualization was made from local climatological data provided by the National Oceanic and Atmospheric Administration (NOAA). Do you think the colored trend lines would be similar or different if they showed cities outside the Midwest United States?
- Discuss the key parts of the visualization and humanize the data itself. Humanizing the data refers to thinking about the data in the context of the humans who were involved at every stage of the data process: idea creation, collecting data, analyzing data, and visualizing data. Humanizing the data makes unseen work visible again. (Alamalhodaie, Alberda, & Feigenbaum, 2020; D'Ignazio & Klein, 2020)
 - ◇ Who collected this data?
 - ◇ What might they be trying to tell us/convince us of?
 - ◇ Who/what was the data collected about?
 - ◇ What would you do differently if you were creating the visualization and/or the data set?

Project ideas for collecting and working with your own weather data:

- Have students track and record daily weather observations such as temperature (thermometer), wind speed (anemometer), barometric pressure (barometer), and precipitation (rain gauge). Students can do this individually, in groups, or as a class.
- Data can be recorded on a flip chart table, a computer spreadsheet, with pictograms, etc.
 - ◇ This could be a great time to explore alternative ways of gathering data: what does the data look like when recorded via regular photographs, paintings or drawings of weather, or documented via poems or lyrics. There is a rich history of humans creating with, around, and about weather. Talk to or collaborate with the art and music teacher(s) at your school for their thoughts, ideas, and specific examples.
- Students can then analyze the collected data, create data visualizations of their own, make predictions about future weather patterns, and discuss the potential impact of these patterns on the local environment and community.
 - ◇ Explore different types of visualizations (e.g. bar graphs, heat maps, scatter plots, photo montages, etc.) and how they might best explain the collected data to the public.
 - How can you best craft the story of the data? Is the data so complex it begins to lose meaning? How can you stay true to the data while also creating a more engaging



story for the audience? Would a more creative representation, such as including atmospheric photographs or a relevant haiku, make the results more impactful and/or memorable to the intended audience?

- Have students consider how weather data is used in reporting and broadcasting by analyzing weather reports to see how the data is presented to the public. Consider how these tactics might be more or less effective than what the students created for their visualizations.
- Explore the science of weather forecasting and all the various sources of data (e.g. satellites, radar, weather balloons, tools like students use above, etc.). This video [21:50], *The Incredible Logistics Behind Weather Forecasting* <https://www.youtube.com/watch?v=VOXxOE8cs7U>, shows the plethora of sources and steps to create a forecast for the public. Discuss the challenges and limitations of weather forecasting, consider what additional data could be helpful to make even more accurate predictions.
- Explore our 6th grade math module that looks at the data of tornadoes (the module was developed to meet 6th grade math standards, but the data and data visualizations would be interesting to students beyond that level as well). <https://data.truman.edu/files/2023/02/6thGrade-ModuleOutline-1.pdf>
- Discuss how 30 years is the timeframe used to adjust climate averages. *U.S. Climate Normals* | National Centers for Environmental Information (NCEI).

Key takeaways:

- Data visualizations are complex with lots of data included and lots of data excluded.
 - ◊ What kind of decisions have to be made?
 - ◊ What ethical concerns should someone have when working with data?
- A lot of human work goes into creating data and data visualizations. Think about who collected and organized the data, who volunteered (or not) to have their data collected, what decisions were made to collect, process and organize the data. Many human hours go into creating a visualization like this one.
- Don't take a visualization at face value. Question it. Think deeper.
 - ◊ How might it be misleading?
 - ◊ How might you have done it differently?
 - ◊ What was done well?
 - ◊ What could be done better?
 - ◊ What other questions does the visualization lead you to have?
- When it comes to data and data visualizations: **keep asking questions!**

References:

Alamalhodaie, A., Alberda, A., & Feigenbaum, A. (2020) Humanizing data through 'data comics': An introduction to graphic medicine and graphic social science. In: M. Engebretsen & H. Kennedy (Eds.), *Data Visualization in Society*. (pp. 347-365). Amsterdam: Amsterdam University Press.

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National Oceanic and Atmospheric Administration. (2022). *Local Climatological Data, 1960-2020* [Data set]. <https://www.ncei.noaa.gov/cdo-web/datatools/lcd>

Truman State University. (n.d.). *Math Modules, 6th Grade. Data Science Outreach*. <https://data.truman.edu/curriculum/>

Wendover Productions. (2022, June 29). *The Incredible Logistics Behind Weather Forecasting* [Video]. Youtube. <https://www.youtube.com/watch?v=VOXxOE8cs7U>

