Plan:

1. Introduce geospatial analysis
2. Explain how to visualize geospatial data

Geospatial Analysis: Viz

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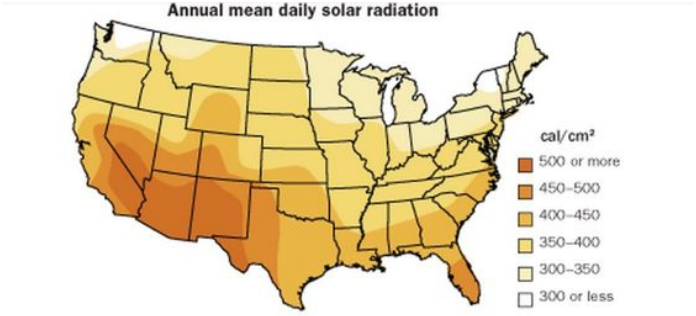
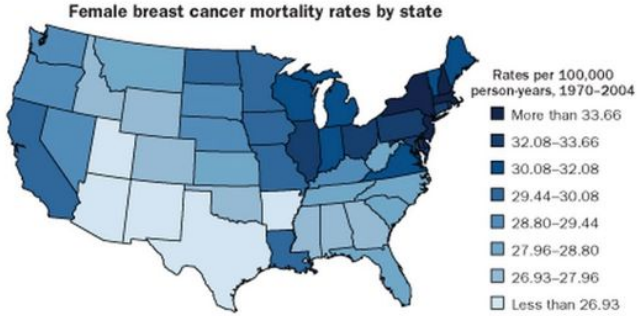
Why Geospatial Analysis?

‘Everything is related to everything else, but near things are more related than distant things.” -Tobler 1979

“...the purpose of geographic inquiry is to examine relationships between geographic features collectively and to use the relationships to describe the real-world phenomena that map features represent” -Clarke 2001

Clearly visualizes important differences in disease distribution



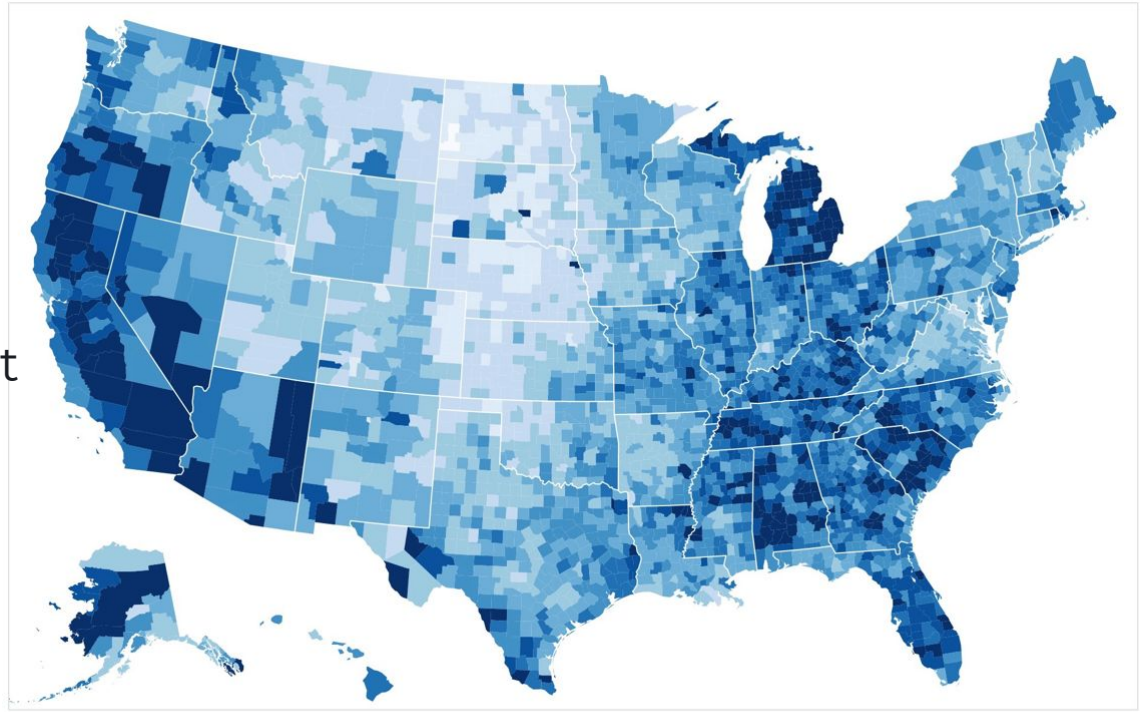


ON THE MAP Scientists who study vitamin D can't help but notice that a host of diseases seem to vary with latitude. Type 1 diabetes, multiple sclerosis and even some cancers appear to be more common in areas that get less sun -- meaning less opportunity for the body to produce vitamin D. The maps above illustrate the apparent link between solar radiation and breast cancer mortality rates.

SOURCE, FROM TOP: D. M. HARRIS AND V.L.W. GO / /J. OF NUTRITION 2004; NATIONAL CANCER INSTITUTE

Visualizing Geospatial Data

Unemployment rate by county (August 2016)



This choropleth encodes unemployment rates from 2008 with a quantize scale ranging from 0 to 15%. A threshold scale is a useful alternative for coloring arbitrary ranges.

Open in a new window.

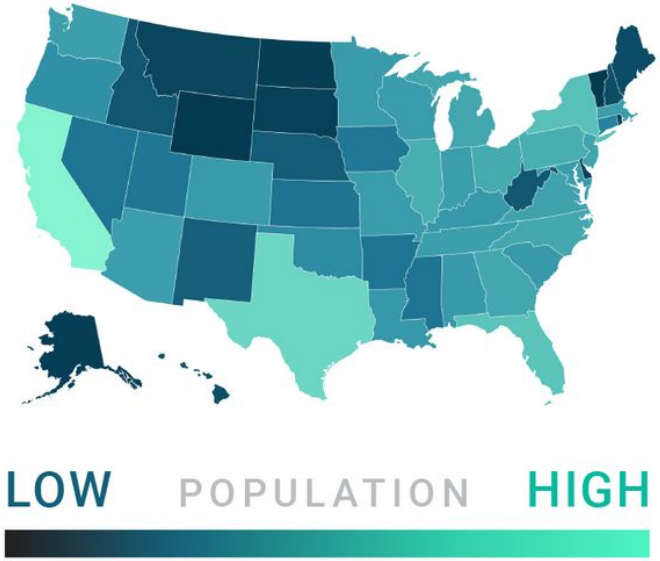
Choropleth maps are useful for visualizing *clear regional patterns* in the data

Source: http://bl.ocks.org/mbostock/4060606

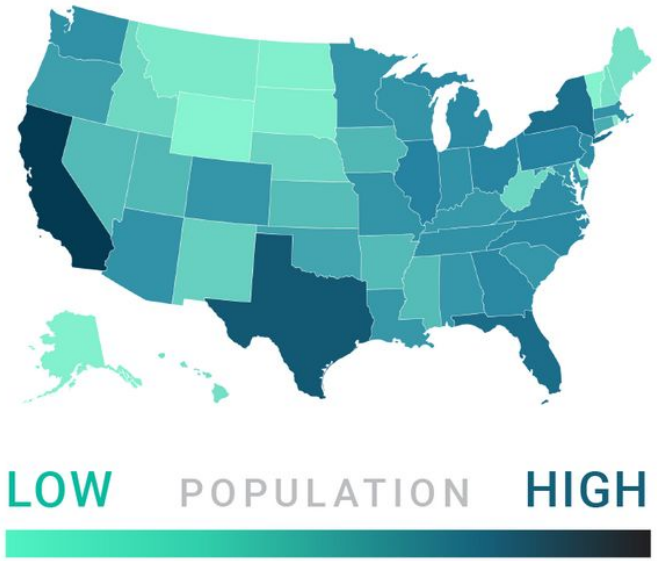
adapted from Brad Voytek

Use light colors for low values. Dark colors for high values.

NOT IDEAL



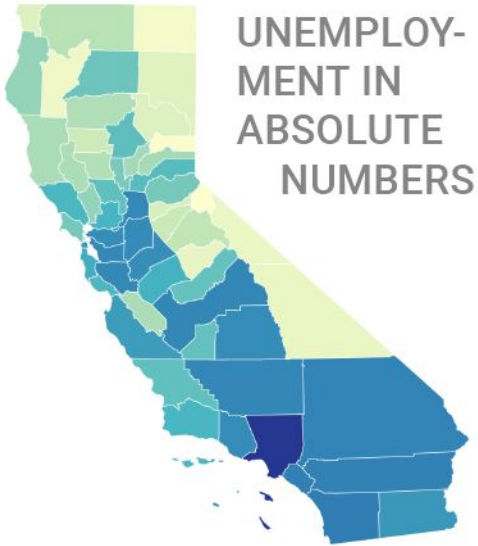
BETTER



https://blog.datawrapper.de/colors/

Choropleth should display relative differences, *not* absolute numbers

NOT IDEAL



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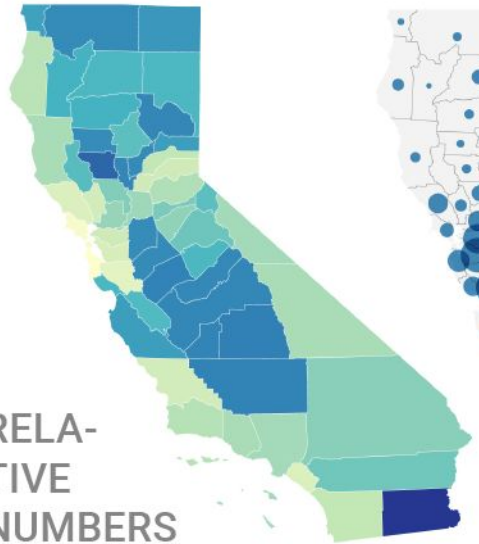
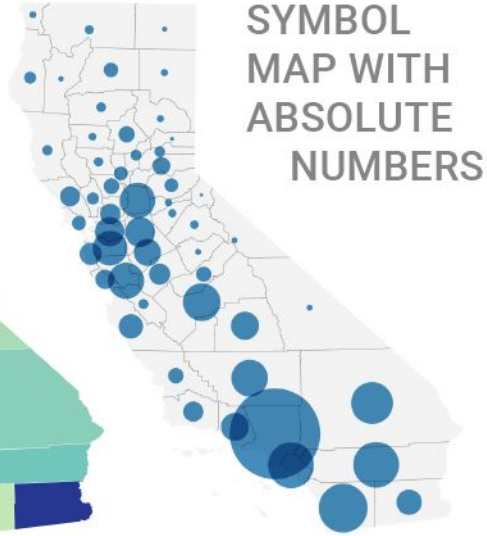
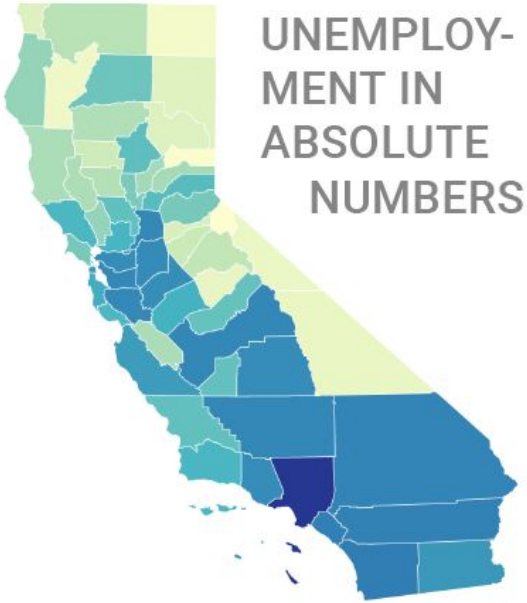


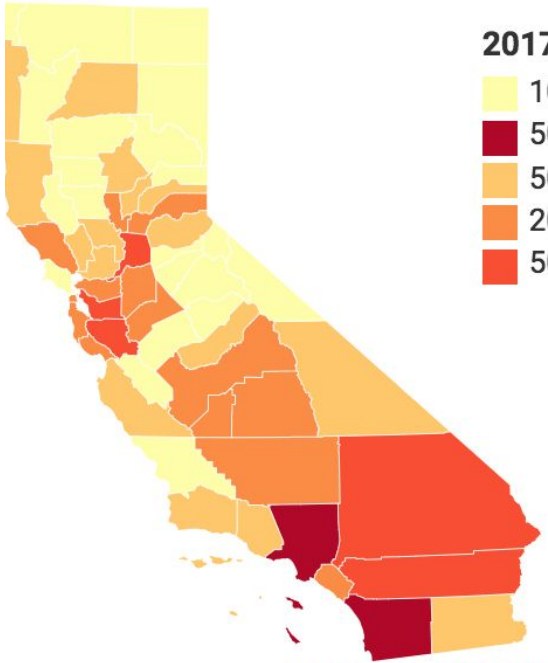


https://blog.datawrapper.de/choroplethmaps/

Map: Where Are Students Attending Charter Schools?

The majority of California's charter school student population is concentrated in Los Angeles, San Diego and Bay Area counties. Hover through the counties on each map for more information on their



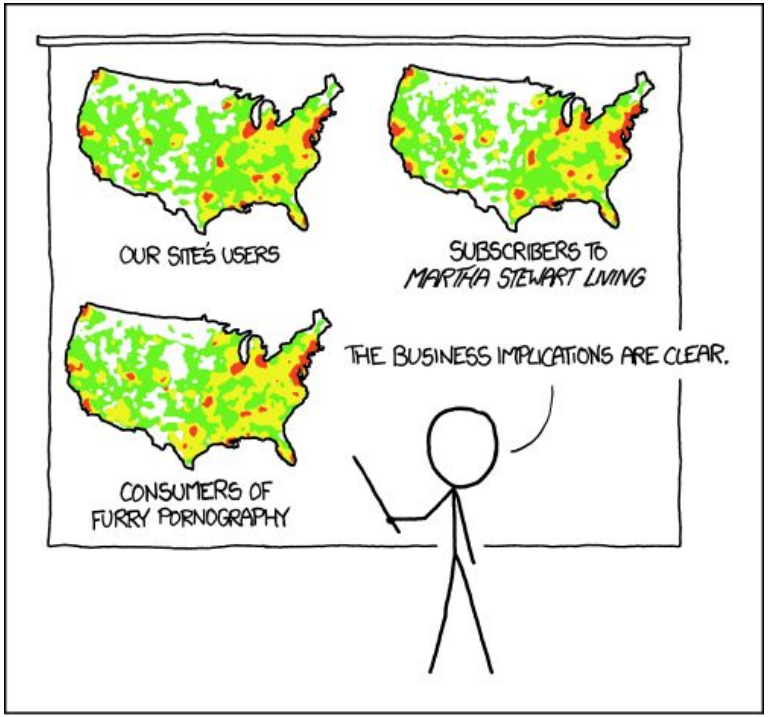


2017-18 Charter Enrollment

- 1000-0
- 50001+
- 5000-1001
- 20000-5001
- 50000-20001

partment of Education • Get the data • Created with Datawrapper

https://calmatters.org/articles/california-charter-school-data-enrollment-cost-teachers-unions/



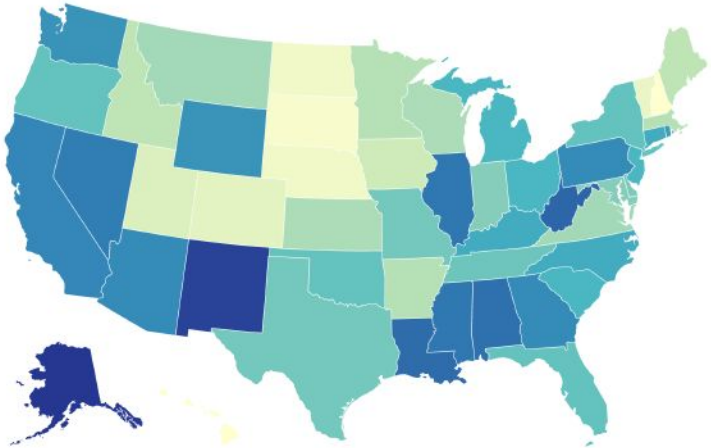
PET PEEVE #208:
GEOGRAPHIC PROFILE MAPS WHICH ARE BASICALLY JUST POPULATION MAPS

Choropleth maps can be **misleading**

https://xkcd.com/1138/

Consider using the smallest unit possible
(but there are exceptions!)

NOT IDEAL



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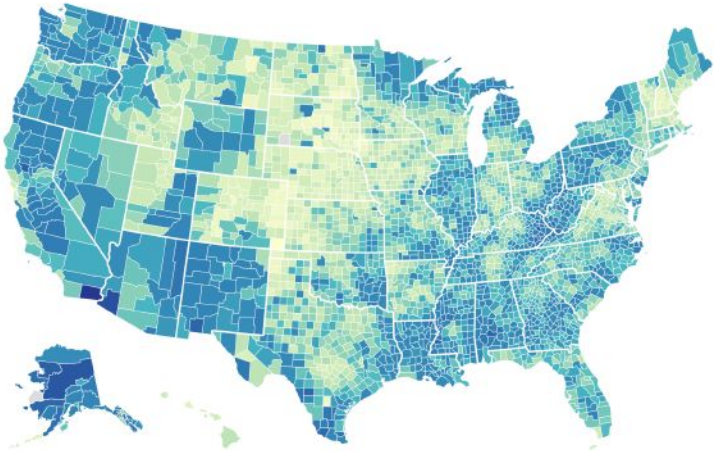
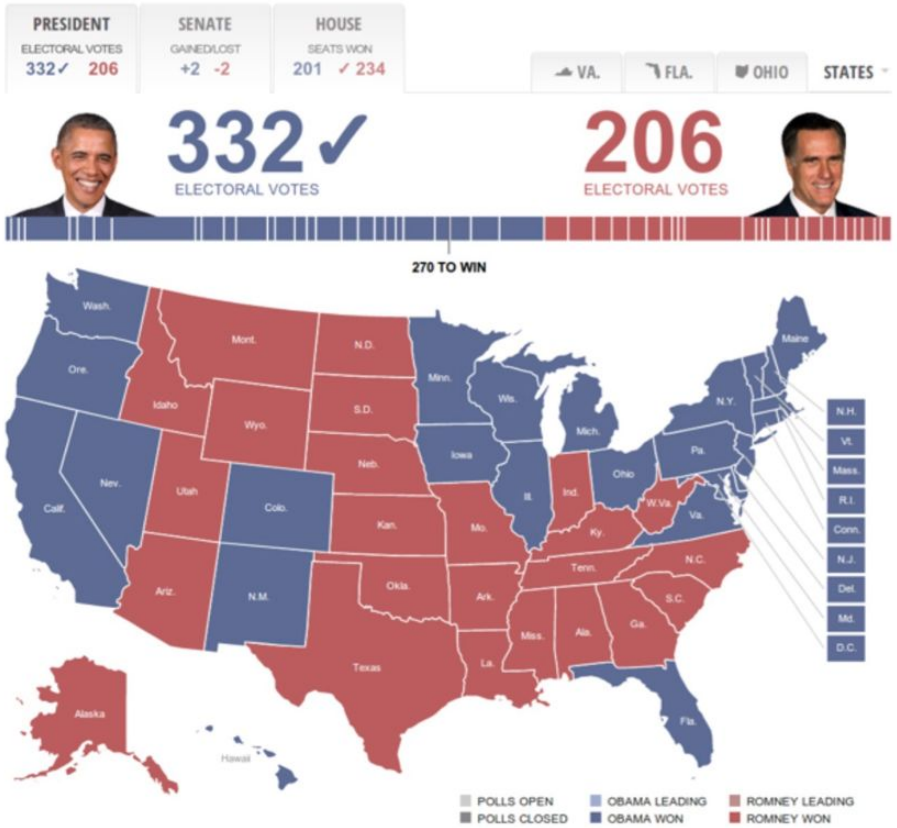


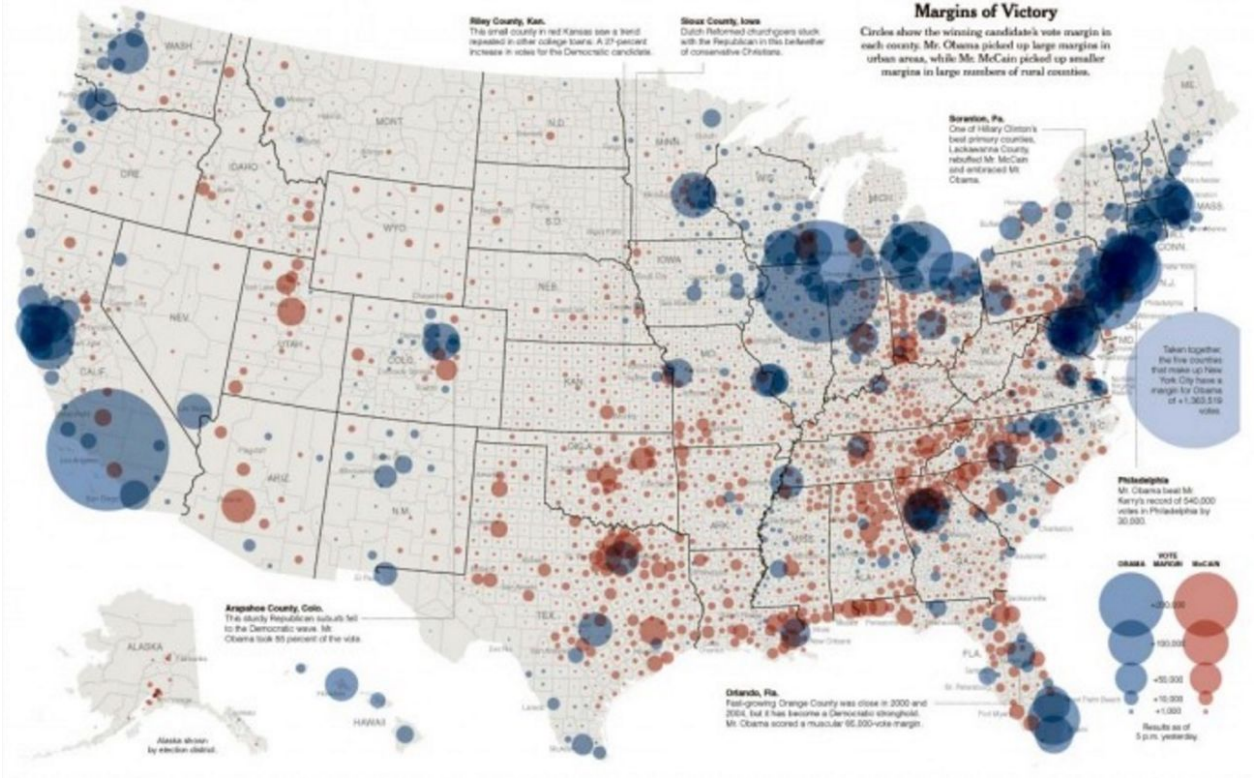
https://blog.datawrapper.de/choroplethmaps/



Sometimes summarizing at the state level is ok...

Source: *Huffington Post*, http://elections.huffingtonpost.com/2012/results

adapted from Brad Voytek



This **bubble graph** more accurately tells the full story, since the size of the bubbles is reflective of the population

...but same data *can* be displayed more effectively and informatively.

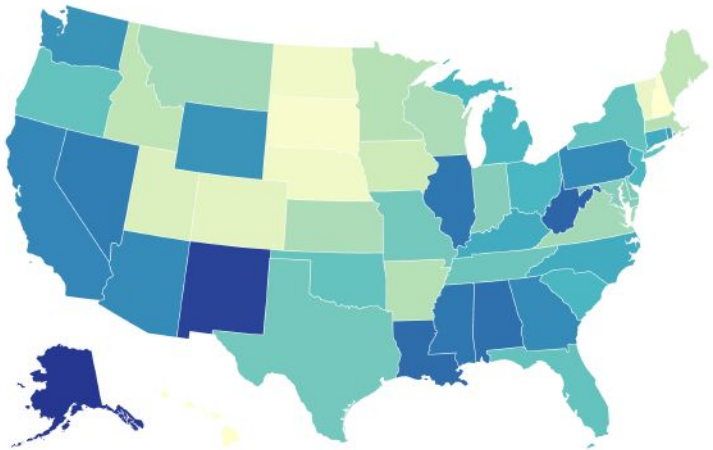
Source: http://www.thefunctionalart.com/2012/11/when-choropleth-maps-deceive.html

adapted from Brad Voytek

Visualization Choices

Cartograms should be considered when displaying how many people were affected

NOT IDEAL



Choropleths answer “How much area was affected?”

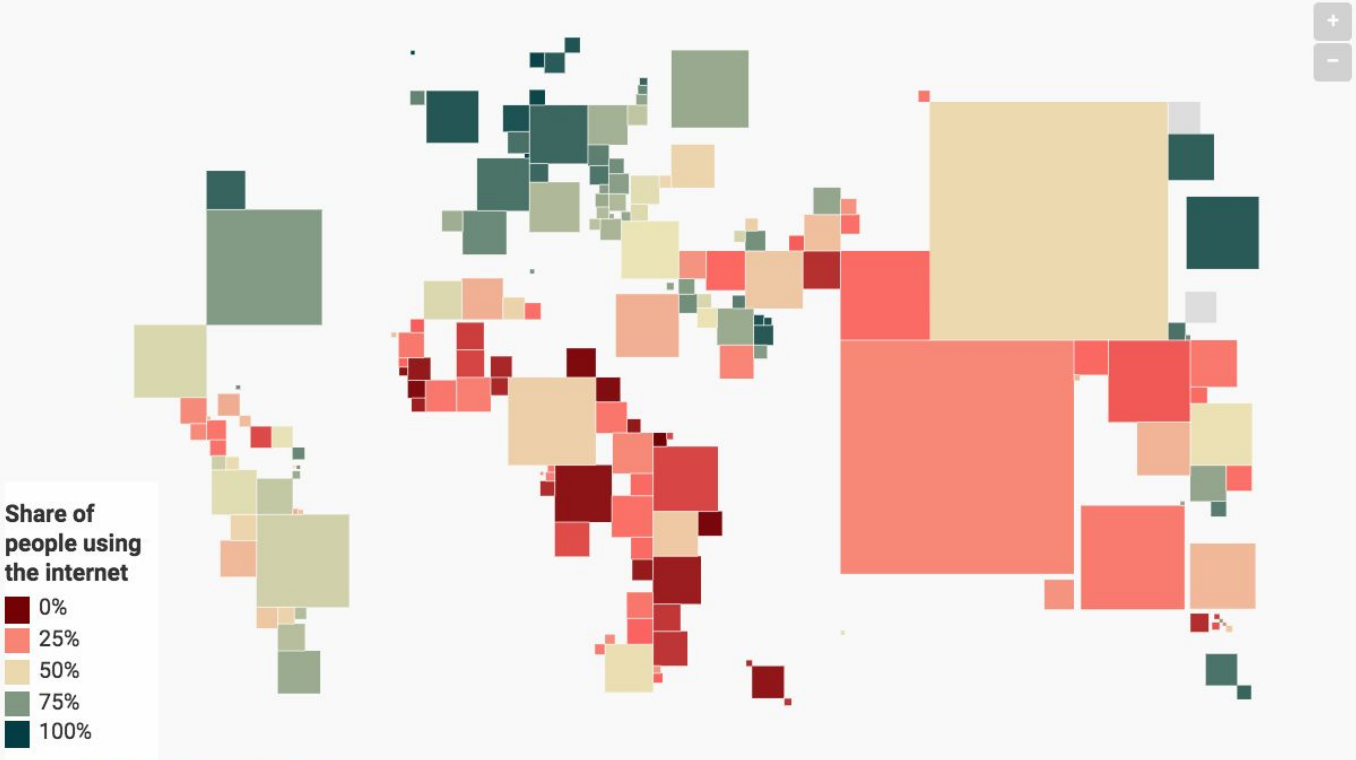
BETTER

Cartograms answer “How many people were affected?”

https://blog.datawrapper.de/choroplethmaps/

Share of individuals using the internet, 2015

Share of individuals using the internet, measured as the percentage of the population. Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc.

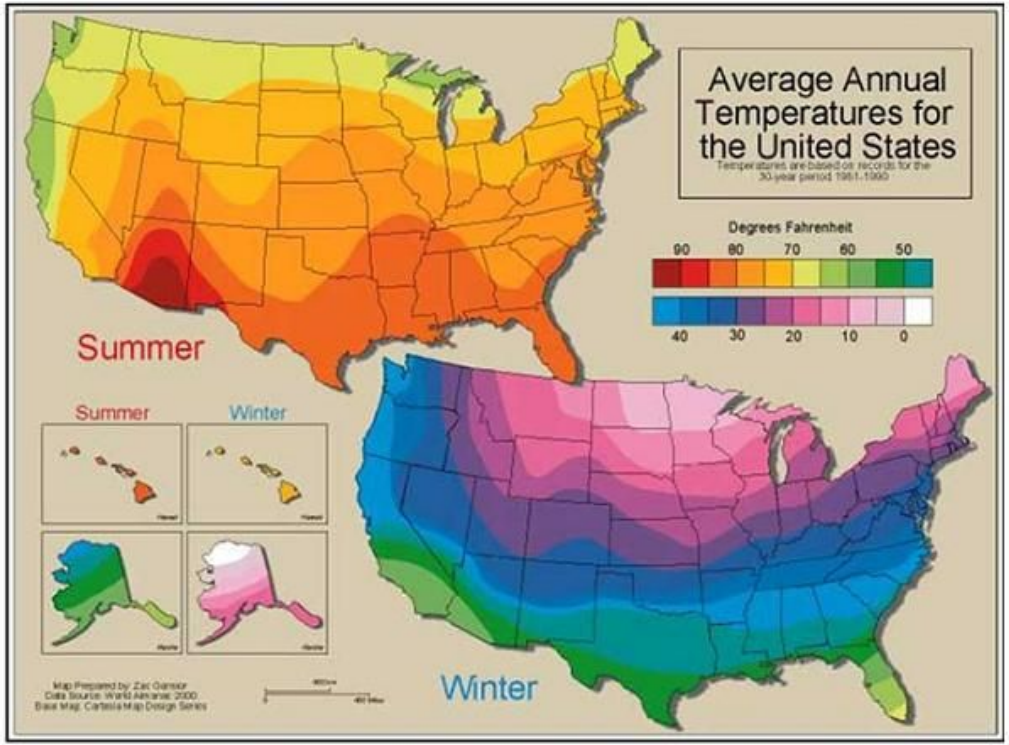


Source: Our World in Data • Get the data

https://blog.datawrapper.de/cartograms/

Isarithmic maps demonstrate smooth, continuous phenomena

(temperature, elevation, rainfall, etc.)



http://enb105-2012s-dem.blogspot.com/2012/03/isarithmic-map.html