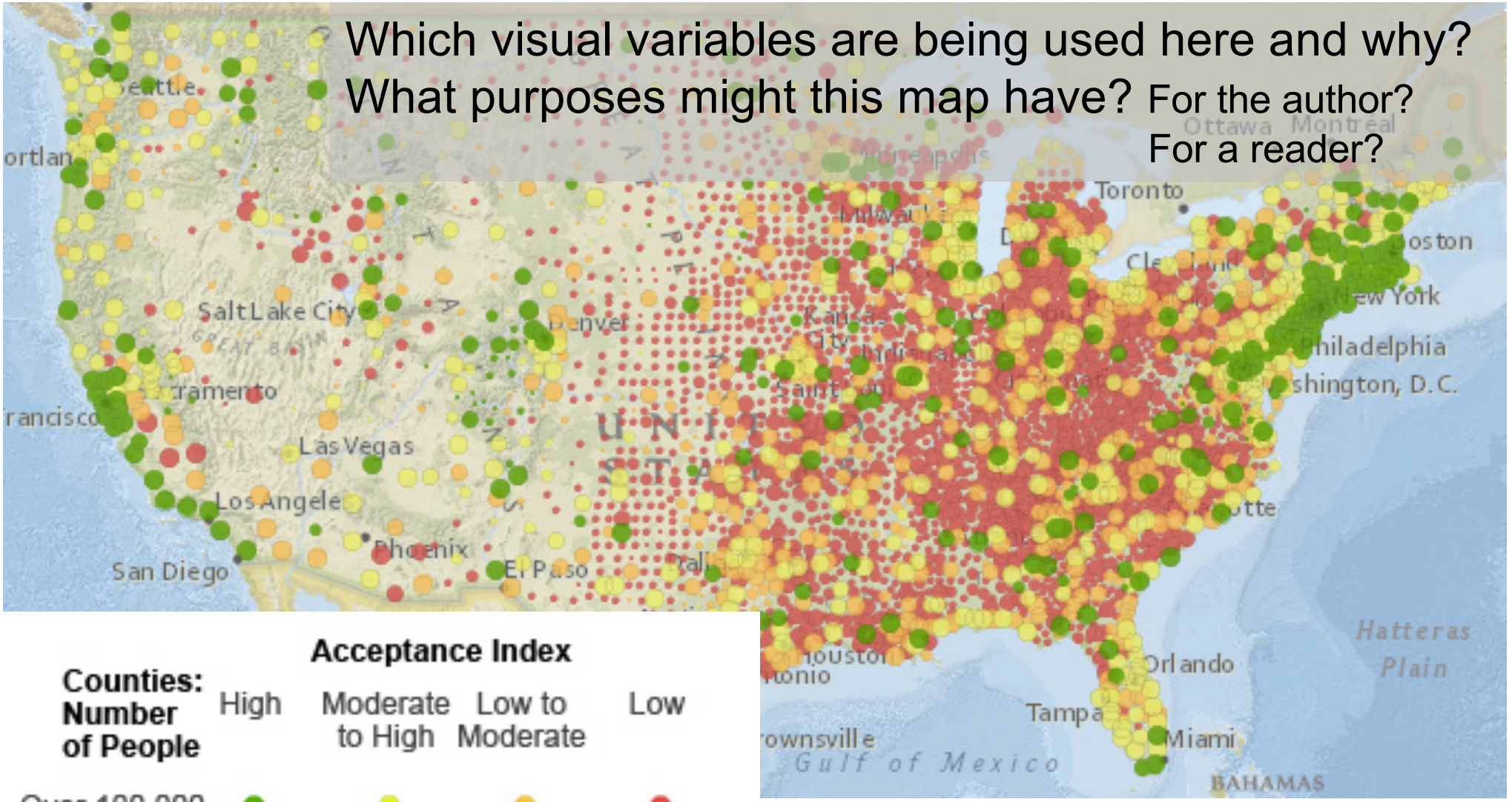
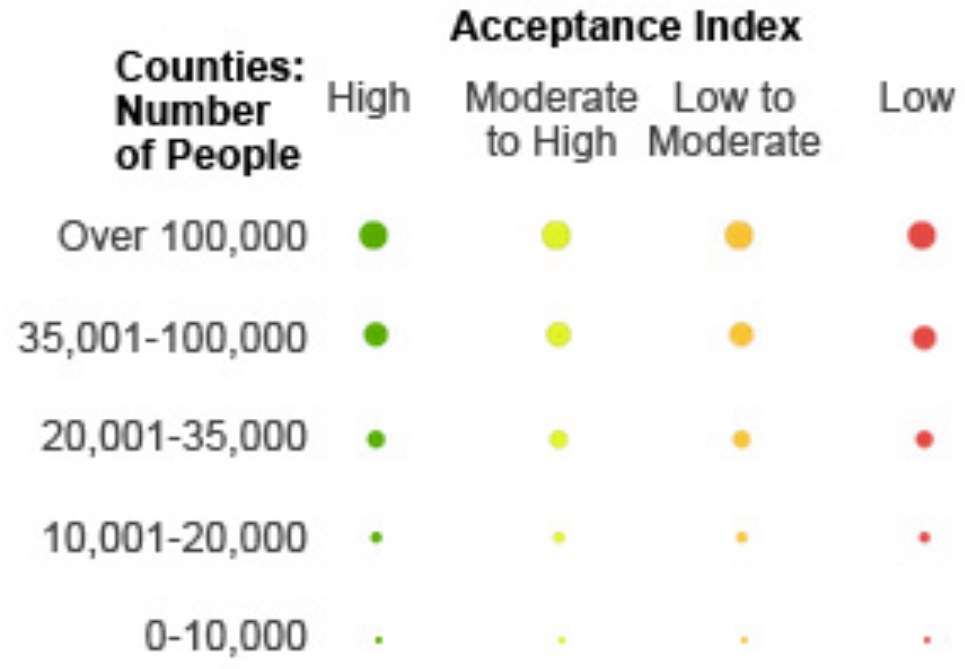
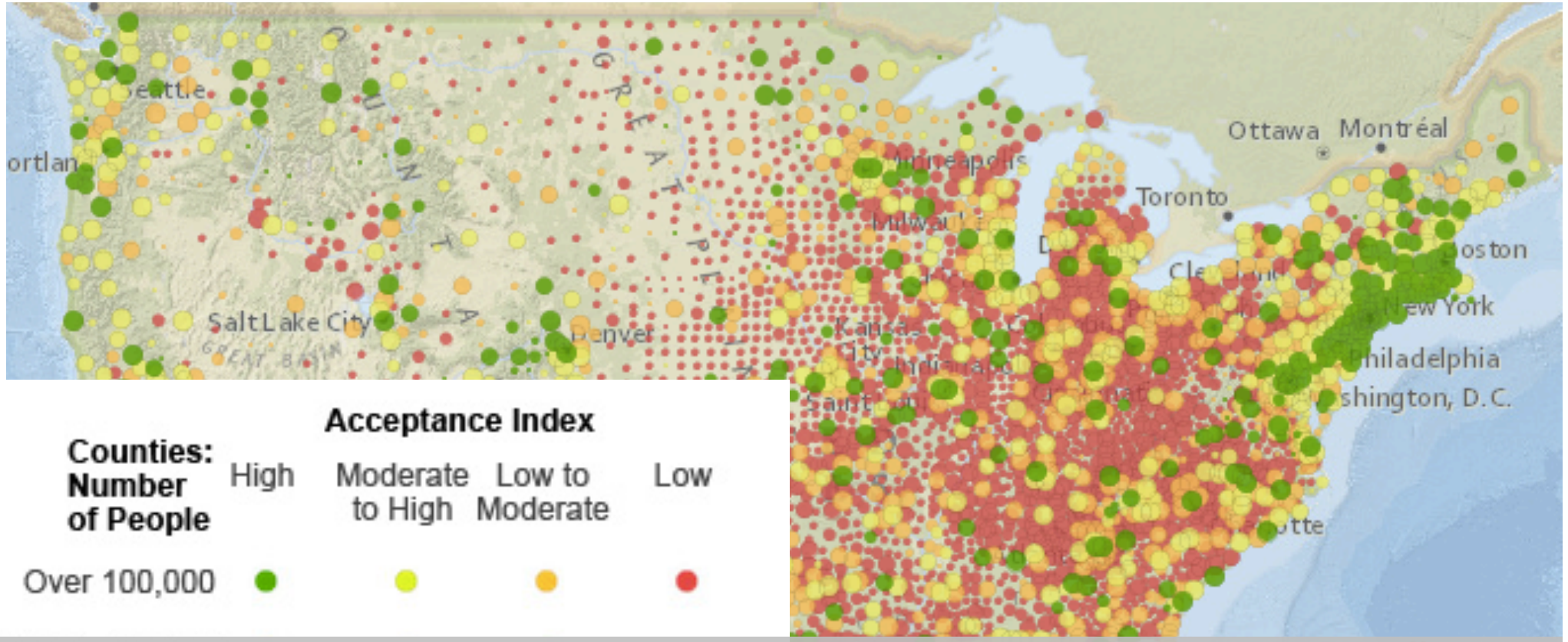
Which visual variables are being used here and why?
What purposes might this map have? For the author?
For a reader?





"Same-Sex Marriage Acceptance Index" (ESRI, 2012)

http://storymaps.esri.com/stories/2012/marriage-equality/



Excerpts from http://storymaps.esri.com/stories/2012/marriage-equality/

“While there has never been a comprehensive geographic survey on this subject, every community and neighborhood within the United States has been described using thousands of demographic variables. These variables can be combined and analyzed to determine spatial patterns and trends.

“Recently voters passed California’s Proposition 8 and North Carolina’s Amendment 1, which forbid same-sex marriage. Using the voting results of these two pieces of legislation, Esri analyzed the demographic and consumer data of these voters to identify the geographic views of same-sex marriage. The results were then summarized using Esri’s Tapestry market segmentation system to extrapolate an acceptance index across the country.[1]

“[1] Note: religious affiliations are not currently incorporated in the model.”

For what map-reading purposes are these data potentially [un]reliable?
What purposes do you imagine ESRI had in making this map?

Geography 360
October 10, 2016

Interpreting data with color

1. *Announcements and questions!*
   - Hit 'Save' frequently.
   - Verify the URLs you turn in work.
   - If you have problems logging in, make sure you are using your UW-GEOG ArcGIS Online account, not the UW one.
   - More creative than the tutorial work:
     A 'project' has been announced on mapping neighborhoods.
2. *Color (continued):* How we talk about it. How we use it. How people perceive and understand it differently.
3. *Anonymous survey:* "What is helping you learn?"

Geography 360
October 10, 2016

Anonymous Survey

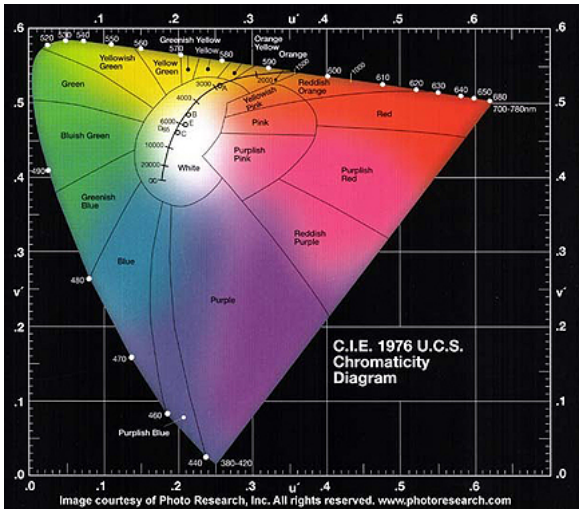
1. What is helping you learn in this class?
2. Is there anything that's not helping you learn? What suggestions do you have?

Color functions in cartography…

- To assist with legibility, clarity, differentiation
- To elicit an emotional or psychological reaction
- For symbolization and classification

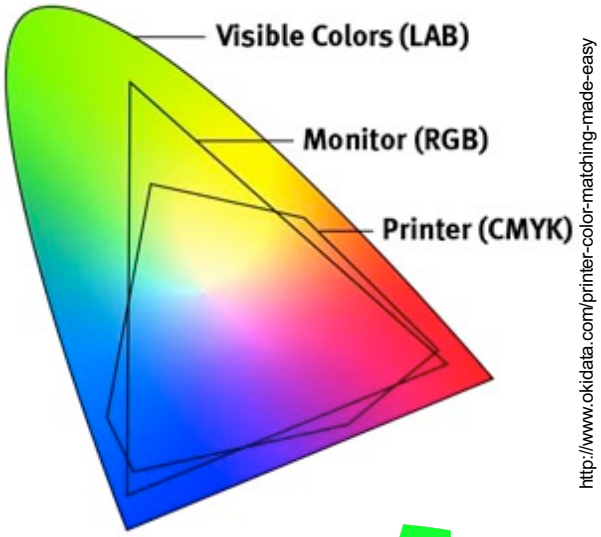
(And color can potentially do the opposite of any of these!)

Describing Color



Color models:

- Are formalized ways of describing colors.
- They usually involve several numbers as 'coordinates'.
- Coordinate axes might include: Hue, Saturation, Red, Green, Value, L, a, b, etc.
- Models include RGB, Munsell, HSV, CIELAB (L*a*b*)



http://www.okidata.com/printer-color-matching-made-easy

Examples from the 'RGB' color model:

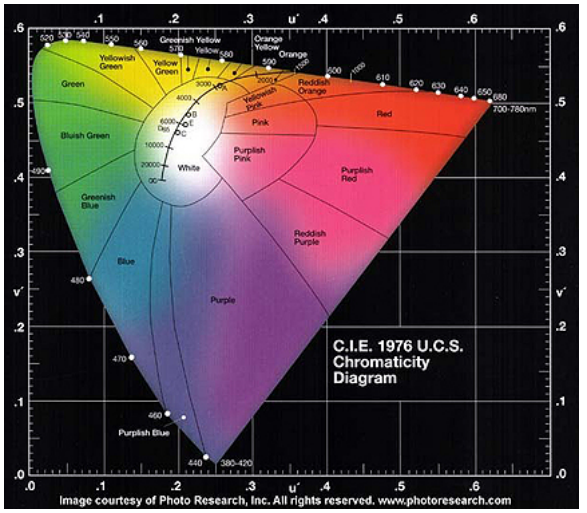
Colors are expressed as (red, green, blue) with each between 0-1, or sometimes 0-255. On the web, this can be written in 'hexadecimal'.

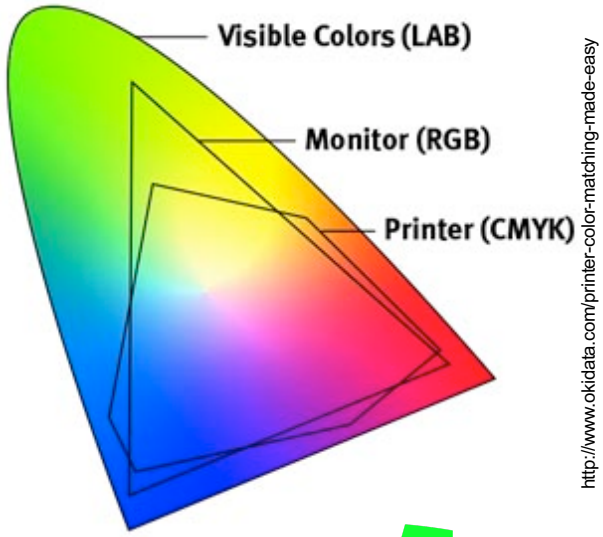
(1, 1, 1) is white (or in hexadecimal: #FFFFFF)
(0, 0, 0) is black (or in hexadecimal: #000000)
(1, 0, 0) is red (or in hexadecimal: #FF0000)
(1, 0.5, 0) is orange (or in hexadecimal: #FF8000)
etc…

Describing Color

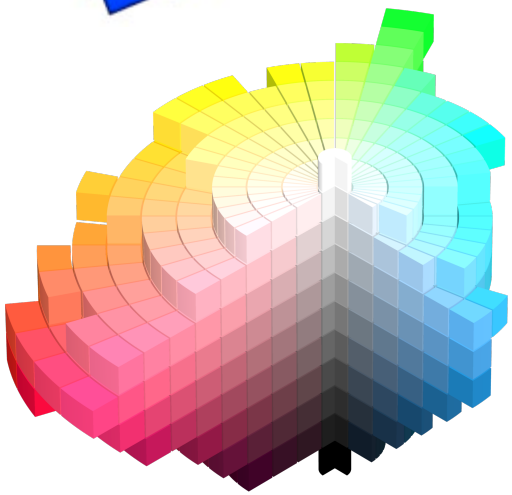
Color models:

- With their coordinates, models generate abstract ‘color spaces’.
  - These differ in what colors they can describe.
  - They also differ in how they portray relationships between colors.
- You have a **perceptually uniform color space** when different ‘distances’ in the color space are proportional to what people perceive is the amount of difference between colors.
  - Example: CIELAB (or L*a*b* or Lab)
  - When is using a perceptually uniform color space useful for mapping?
    - When you want to visually express quantitative relationships between numbers.
      (Think: ‘interval’ data and above)
  - RGB is not perceptually uniform.

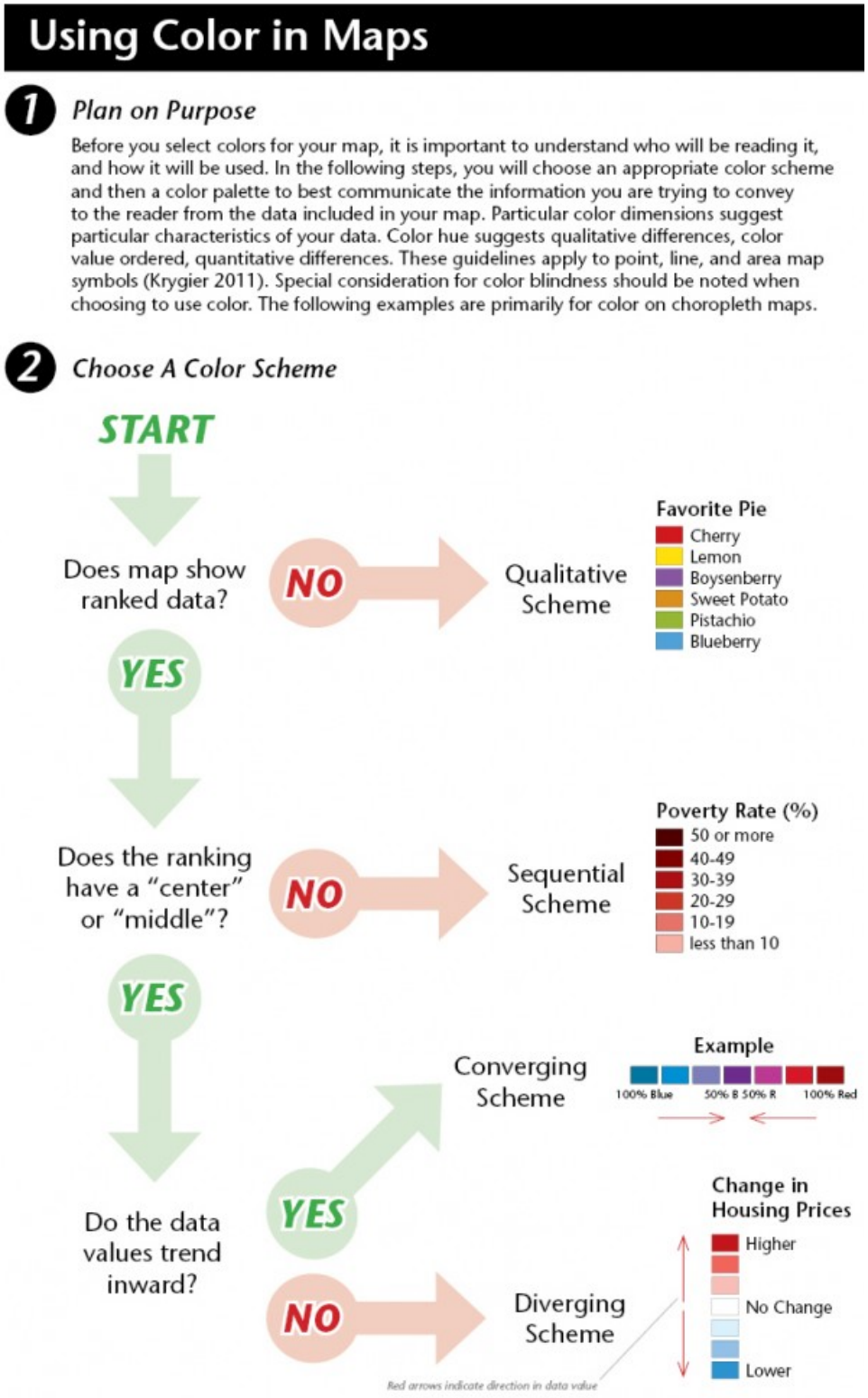




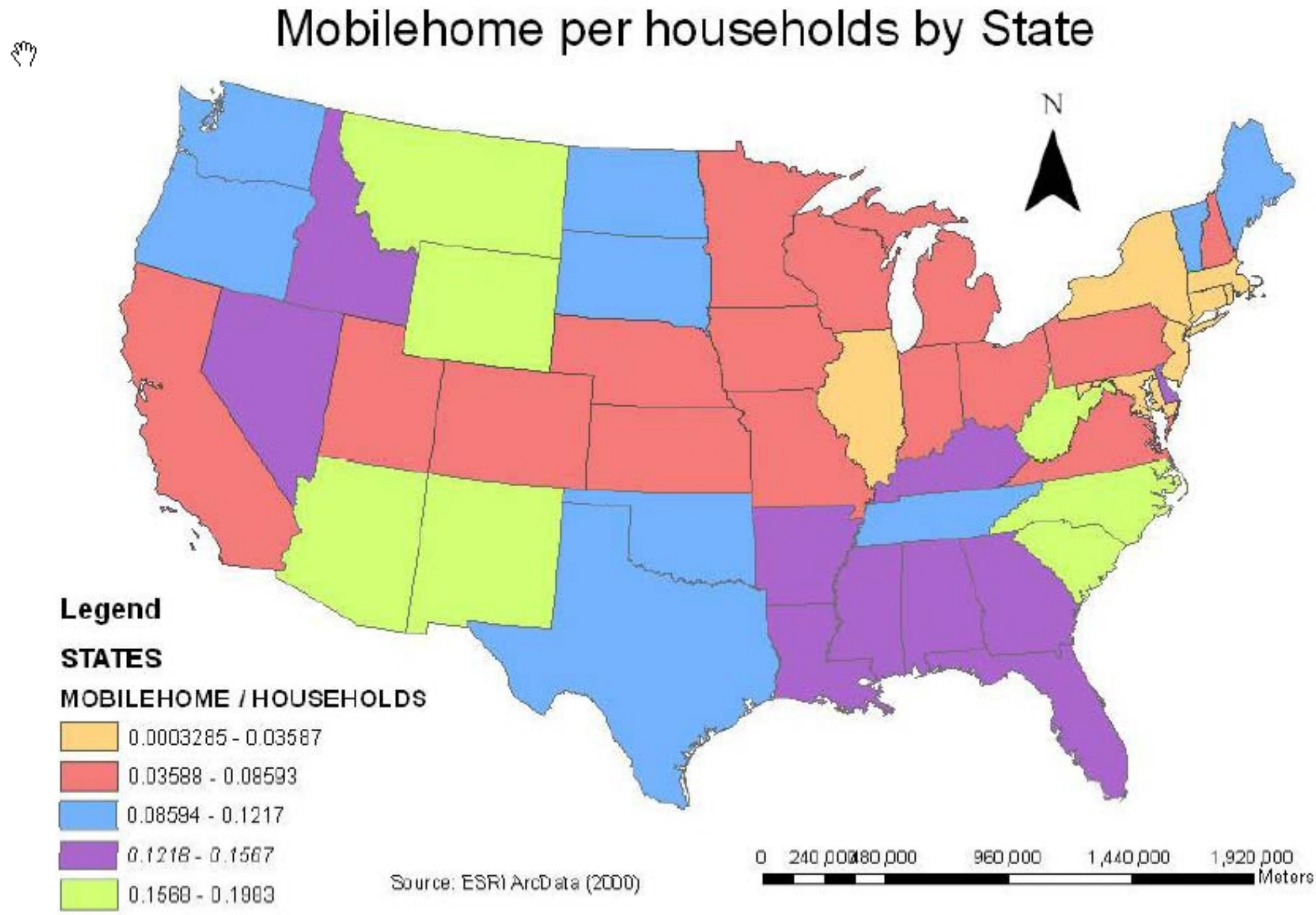
http://www.okidata.com/printer-color-matching-made-easy



A starting point for thinking about color in choropleth maps when you are mapping.



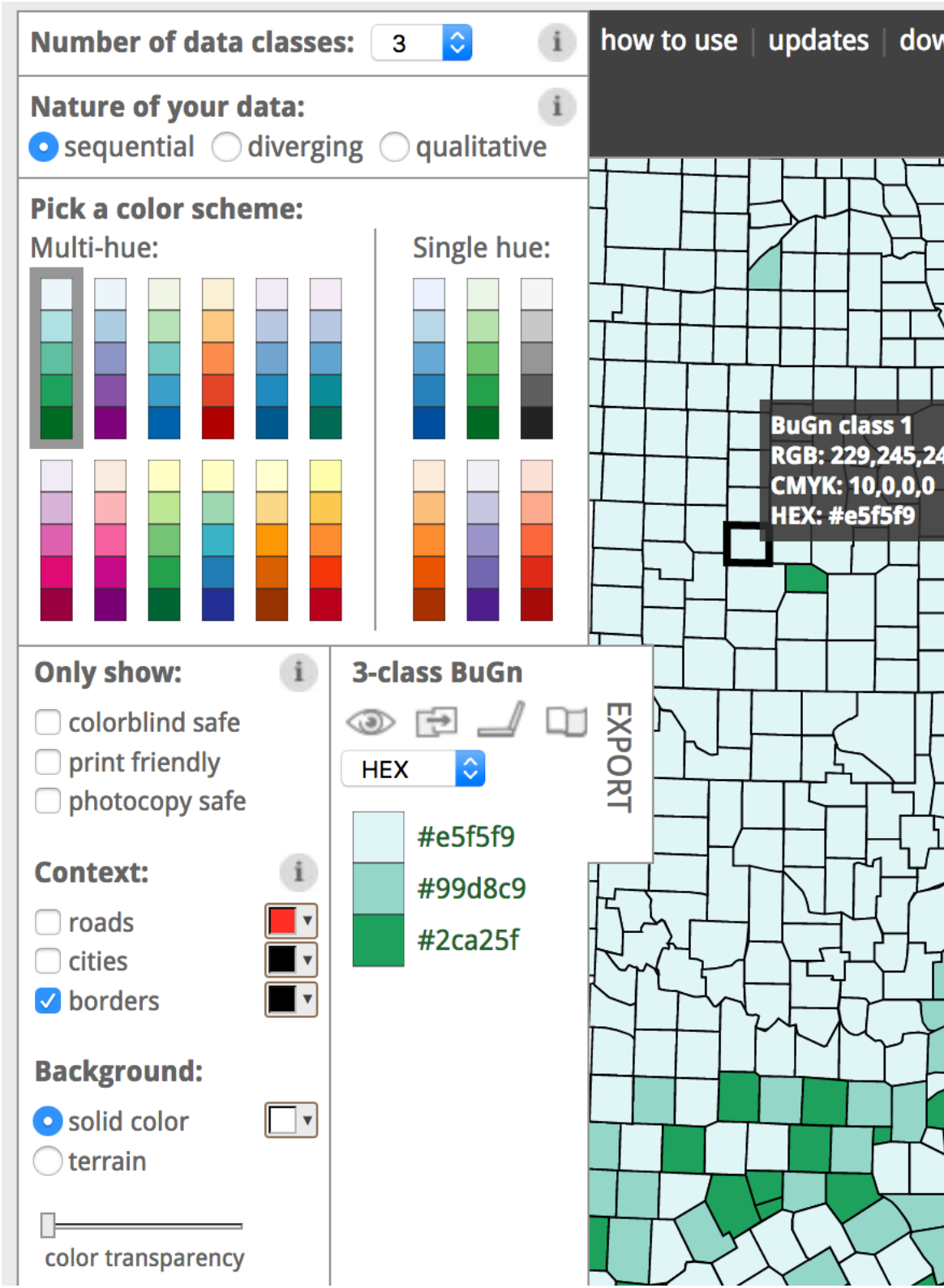
What **not** to do!

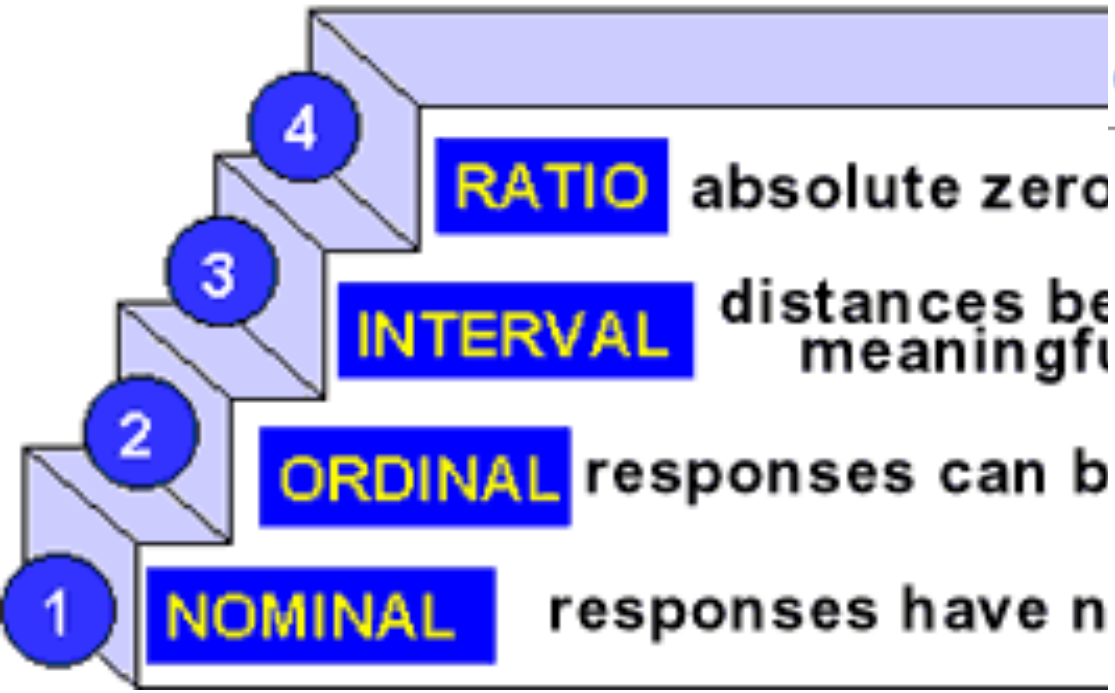


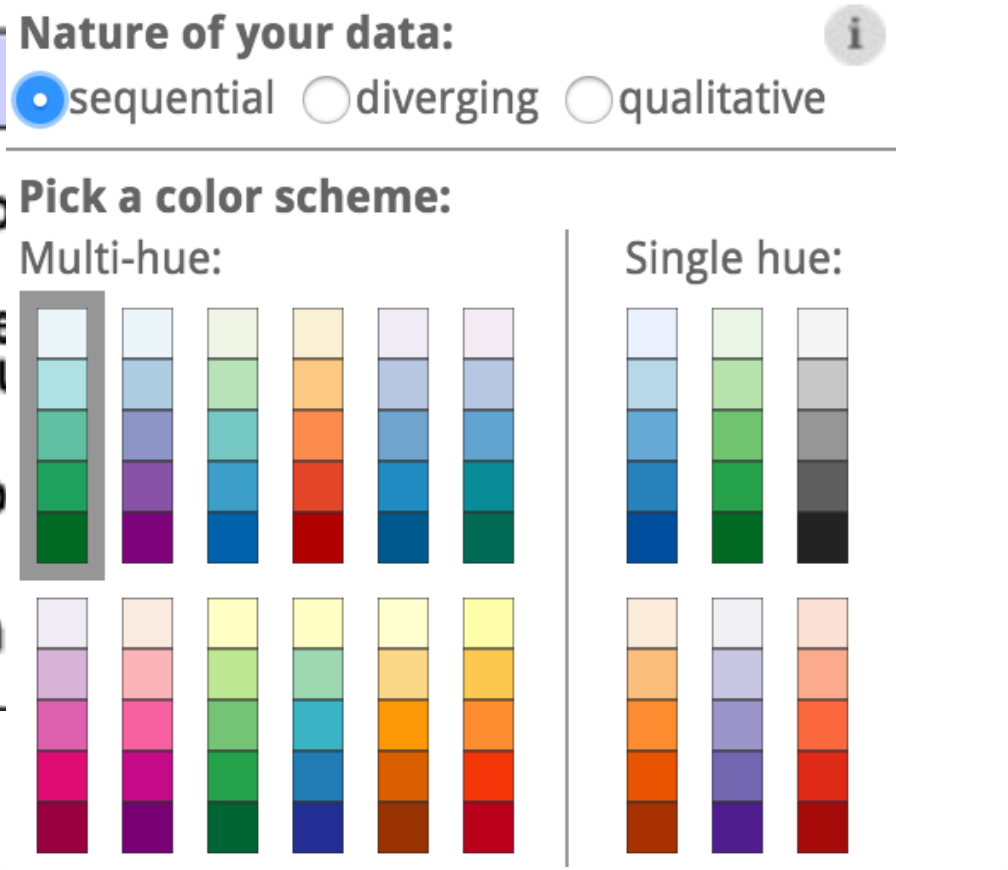
Color in GIS as of 2016

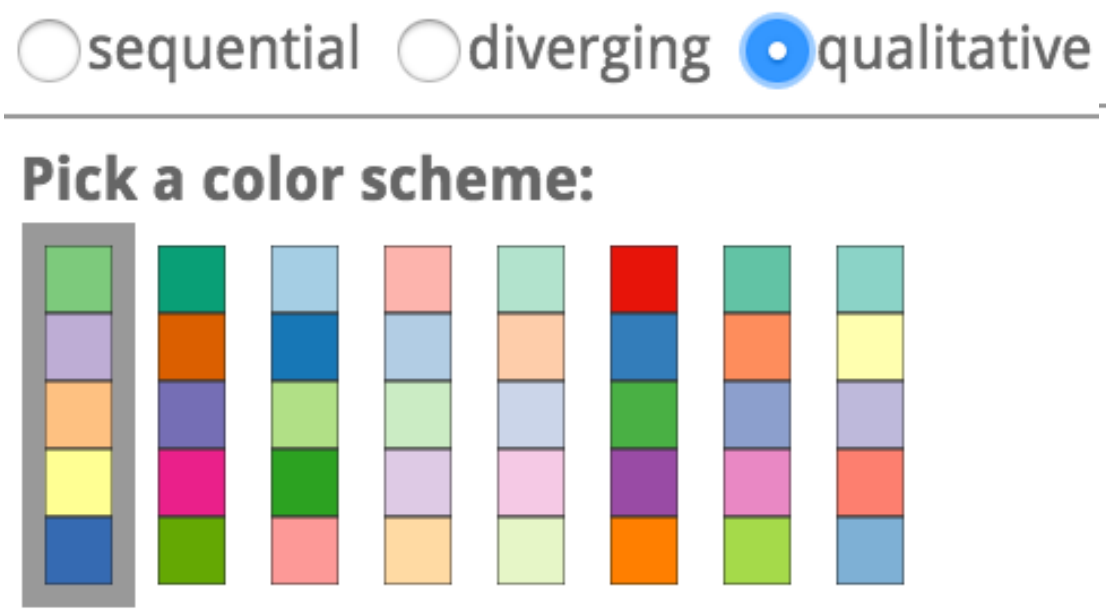
- ArcGIS Online is trying to have ‘smart mapping’: guessing some settings for you, but this is also just a starting point.

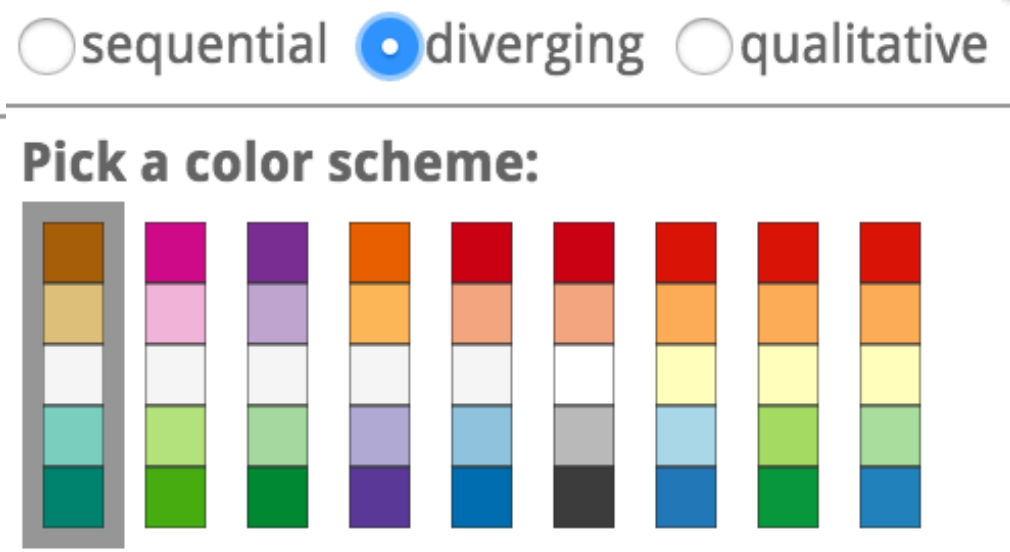
- Built-in choices are getting better.
  - Some are based on *‘ColorBrewer’*, or you can go to its website and get advice and colors there: http://colorbrewer2.org




4
RATIO
absolute zero
3
INTERVAL
distances be
meaningfu
2
ORDINAL
responses can b
1
NOMINAL
responses have n


Nature of your data:
sequential
diverging
qualitative
Pick a color scheme:
Multi-hue:
Single hue:


Nature of your data:
sequential
diverging
qualitative
Pick a color scheme:


Nature of your data:
sequential
diverging
qualitative
Pick a color scheme:

Other relationships to express with color: Thresholds and transitions

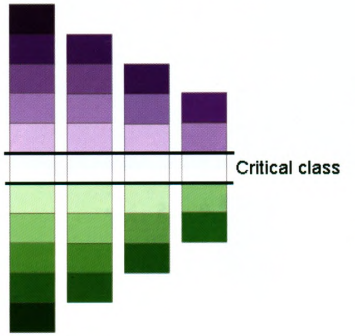


Figure 8.7 Diverging purple-green color schemes with odd numbers of classes. Each scheme is symmetrically organized around a middle light class that corresponds to a critical range in mapped data.

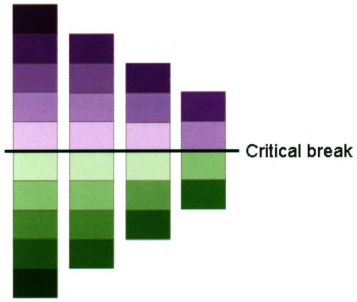
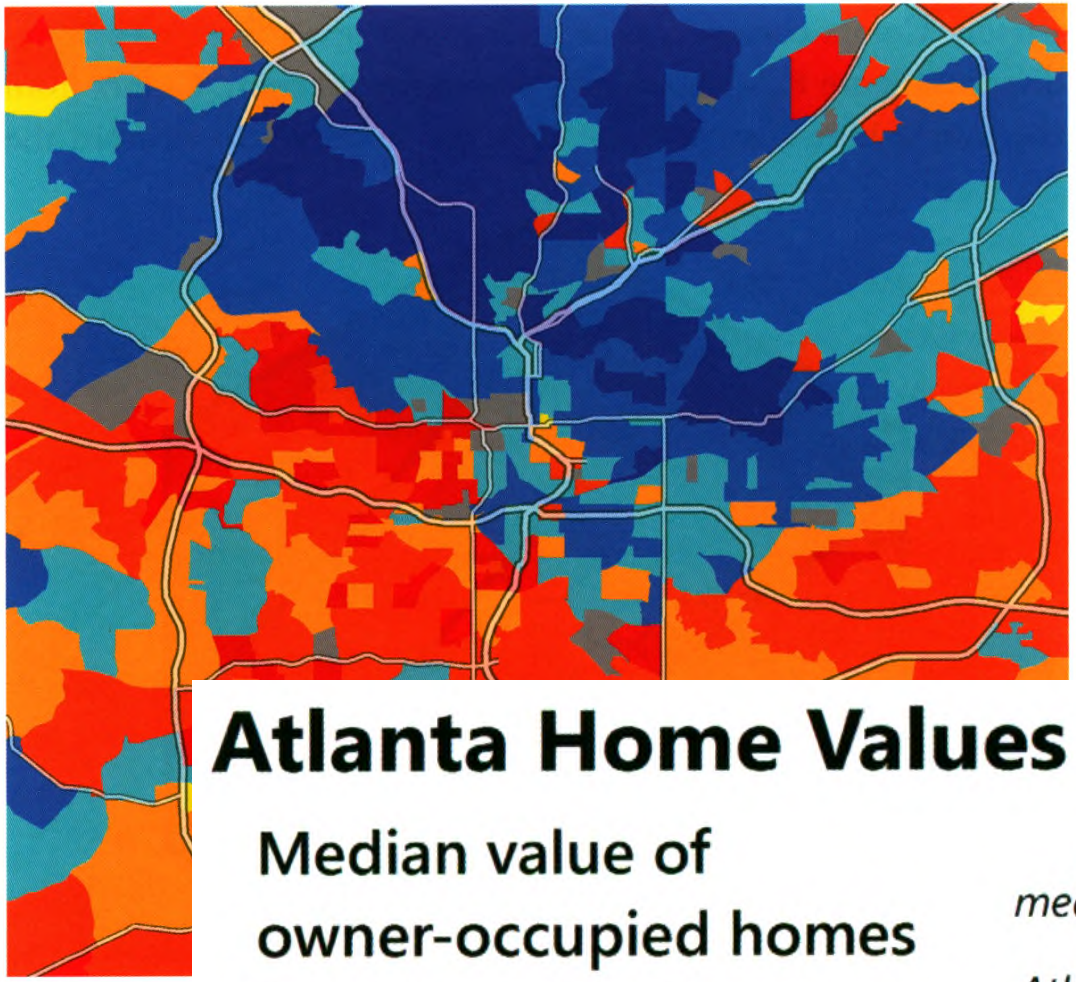
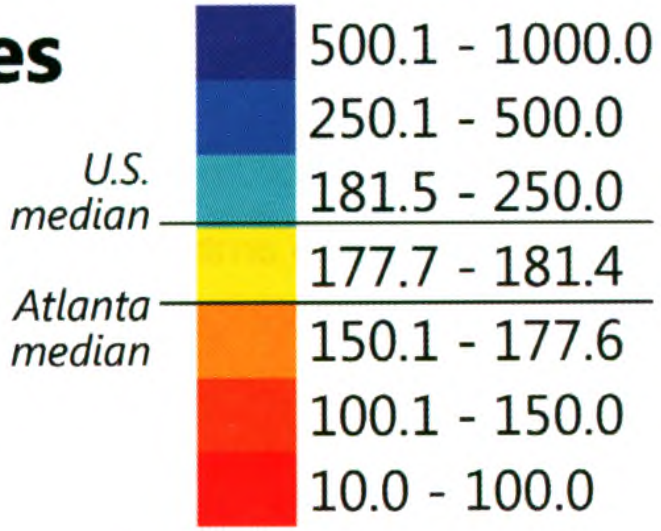


Figure 8.8 Diverging purple-green color schemes with even numbers of classes. Each scheme is symmetrically organized around a middle class break that corresponds to a critical data value.



Atlanta Home Values

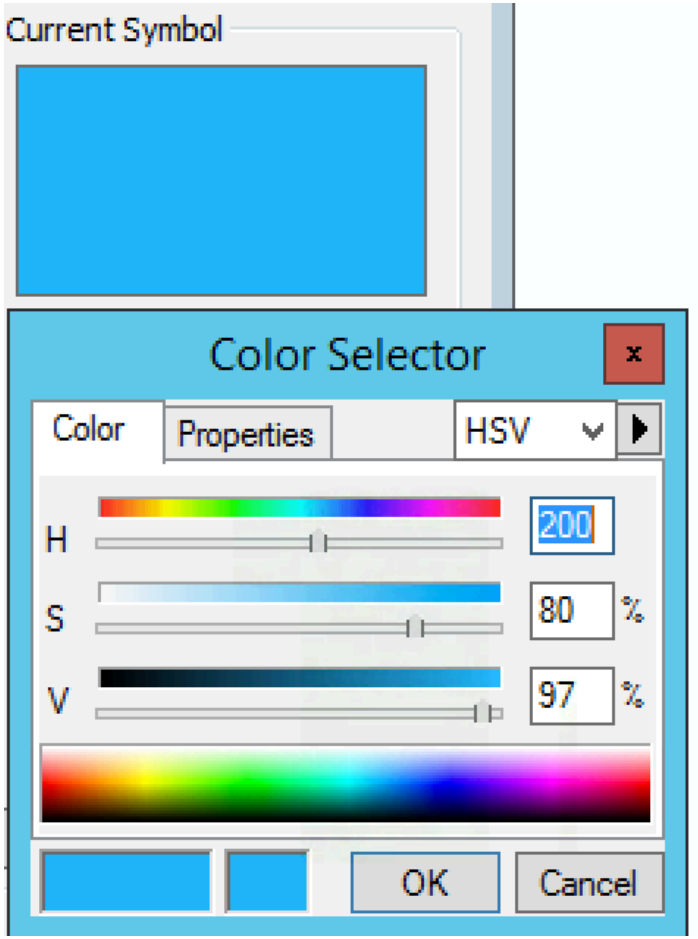
Median value of owner-occupied homes by census block group (in thousands of dollars)



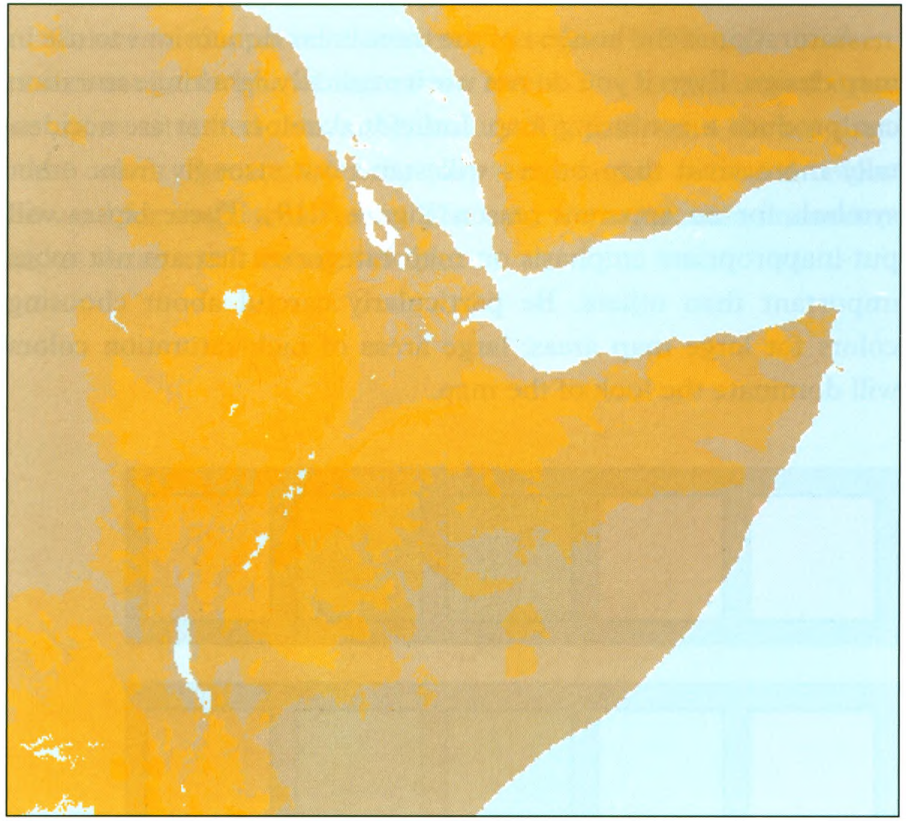
Color in GIS as of 2016

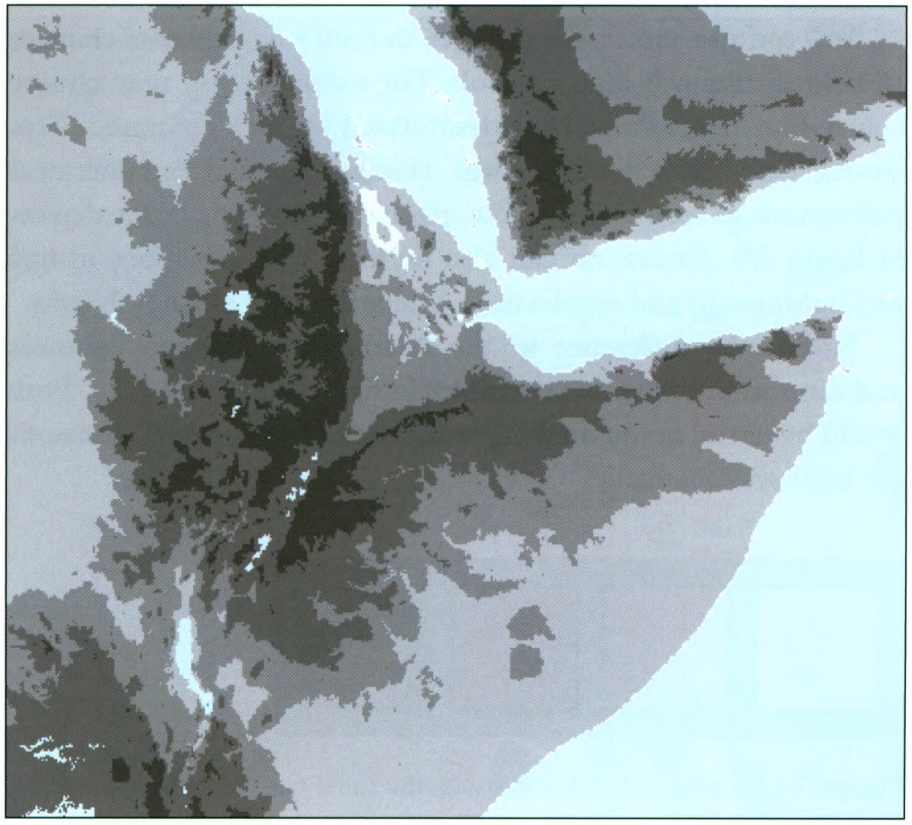
- Custom choices (such as those from ColorBrewer) can be inputted using RGB (ArcGIS Online) or using HSV at best (ArcMap)…

…but there are websites you can use to convert colors you've chosen using other color models to RGB (including the hexadecimal form) or HSV : http://colorizer.org/



Saturation vs. Lightness





Saturation can work better when combined with lightness:

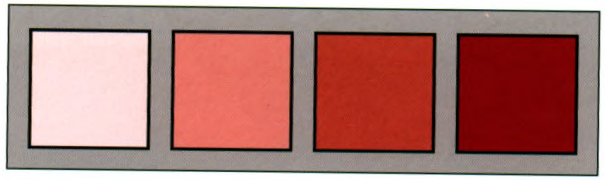
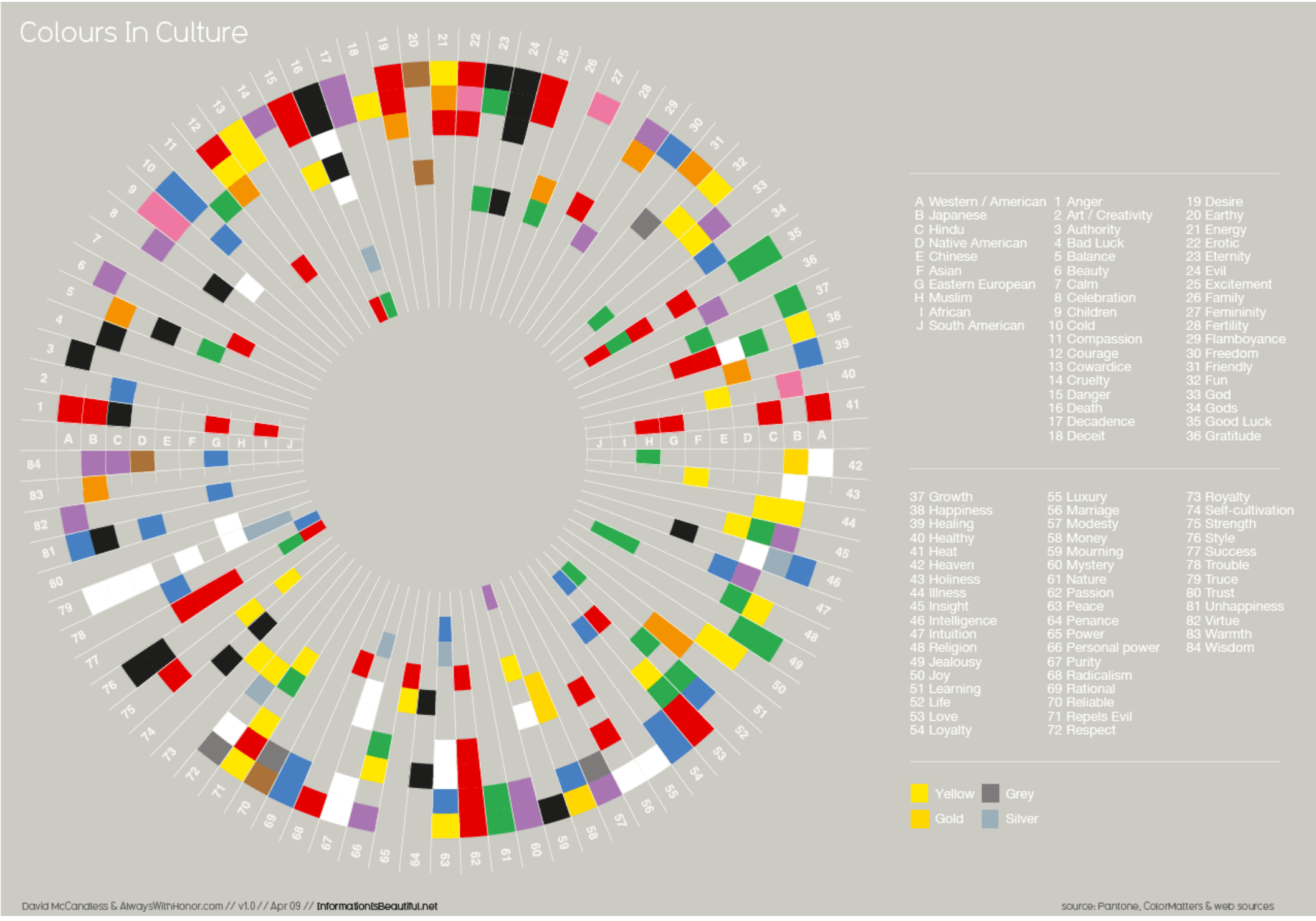


Figure 7.17 A series of four colors with the same hue, decreasing in lightness and increasing in saturation toward the right. They range from light-desaturated red to dark-saturated red.

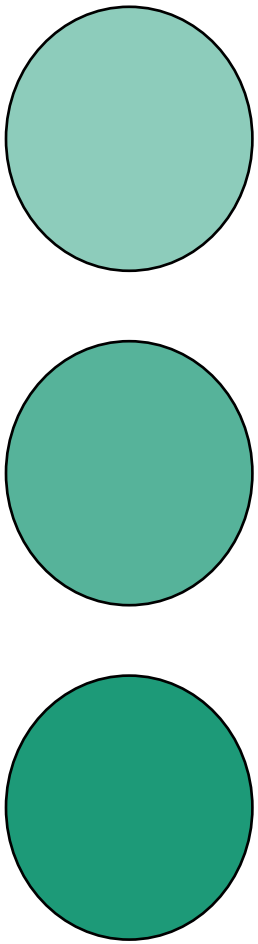
If you are not careful, your colors may not be read the way you intend…

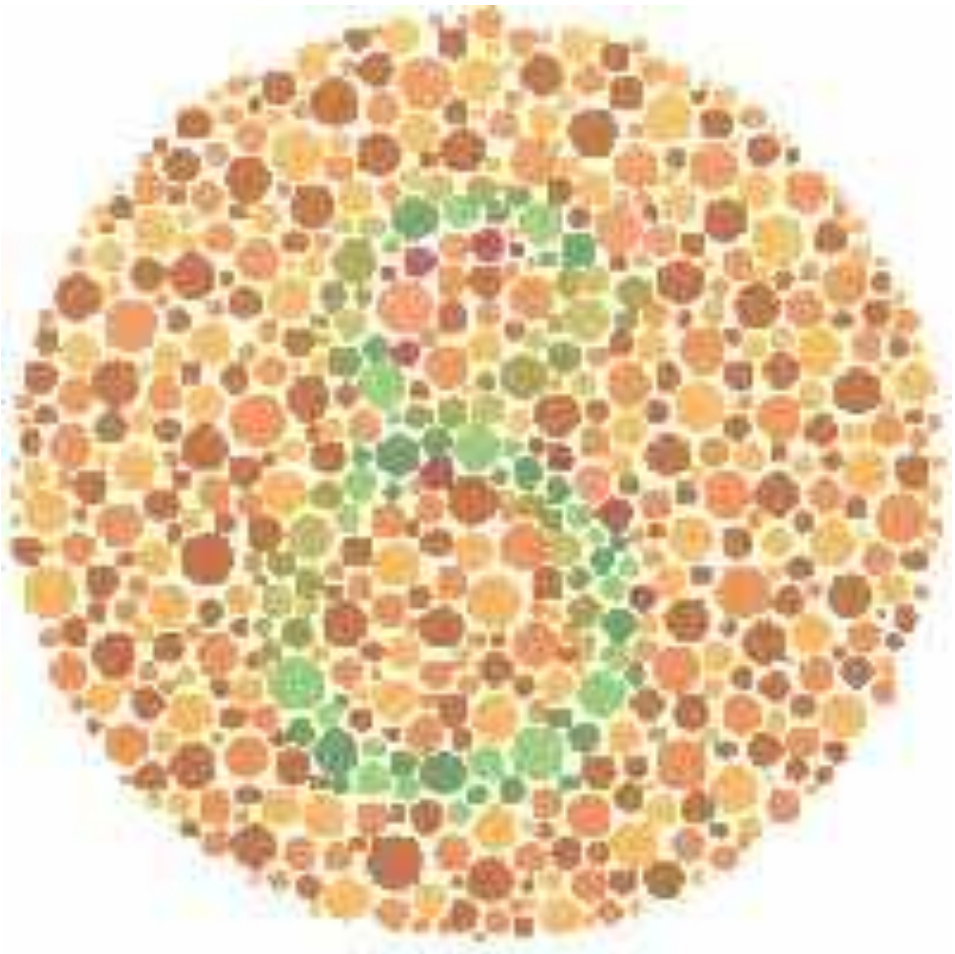


http://www.informationisbeautiful.net/visualizations/colours-in-cultures/

If you are not careful, your colors may not be read the way you intend…

Differences in color perception





Color Oracle

Design for the Color Impaired

Color Oracle is a free color blindness simulator for Window, Mac and Linux. It takes the guesswork out of designing for color blindness by showing you in real time what people with common color vision impairments will see.

Color Oracle applies a full screen color filter to art you are designing – independently of the software in use. Eight percent of all males are affected by color vision impairment – make sure that your graphical work is readable by the widest possible audience.

Read this article for more information: Color Design for the Color Vision Impaired

http://colororacle.org/index.html