Introduction to R for high school science: Teaching and doing good statistics and graphics

Christopher W. Ryan. MD, MS, MSPH, PStat®

Agency Statistical Consulting, LLC

October 31, 2024

What is R? Why use it?

- R is software for data analysis and graphing
- R is entirely free and non-commercial
  - No accounts, no personal information, no ED-2 issues
- R is powerful but can also be used in a very beginner-friendly way
- R is "command-line." You type commands on the keyboard.
  - major advantages
    - the code documents the analysis: "reproducible research"
    - save commands and re-run them later
    - easier teaching, especially remotely
  - disadvantages
    - it's different from what many people are used to these days
    - however, there are point-and-click interfaces to R, e.g. Rstudio
    - R on a Chromebook: possible but not easy

Agency
Statistical
Consulting

What is R? Why use it?

- There's almost no part of the NYSSLS that R would not support
  - "developing and using models"
  - "using mathematics and computational thinking"
  - "engaging in argument from evidence"
  - "asking questions and defining problems"
  - "analyzing and interpreting data"
  - "communicating information"
- Likewise for the Computer Science and Digital Fluency Learning Standards
- R inevitably invites students to think actively about data
  - "I got to see data for the first time in a different way."
  - "I had the most fun when I realized I could play around with the program."

Agency
Statistical
Consulting

What is R? Why use it?

- There's almost no part of the NYSSLS that R would not support
  - "developing and using models"
  - "using mathematics and computational thinking"
  - "engaging in argument from evidence"
  - "asking questions and defining problems"
  - "analyzing and interpreting data"
  - "communicating information"
- Likewise for the Computer Science and Digital Fluency Learning Standards
- R inevitably invites students to think actively about data
  - "I got to see data for the first time in a different way."
  - "I had the most fun when I realized I could play around with the program."
- So let's use R!

Agency
Statistical
Consulting

Scratching the surface: rough agenda for today

1. kicking the tires
2. graphing
3. getting your data into R
4. adding packages
5. simulation for teaching: sampling variation

Workshops from Agency Statistical Consulting, LLC

- Introduction to R for high school students
- Data visualization: making effective graphs
- Chi-square and T-test and P-values, Oh My! How statistical inference really works
- and custom workshops as requested

Come visit in the exhibit hall!

cwr@agencystatistical.com

www.agencystatistical.com