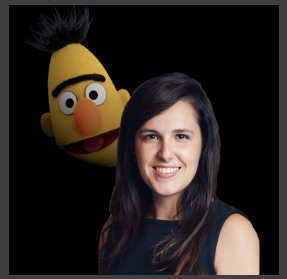
LASER Presents

Totally RAD!: Learning Trajectory for Reasoning About Distributions




Lab for Advancing Statistics Education Research



Chelsey Legacy

Pablo Vivas Corrales

Andrew Zieffler

Regina Lisinker

Vee Vyas

Distributions in Minnesota Mathematical Standards

Code	Benchmark
2.1.1.3	Collect and use data to consider and decide what data will answer a question. Represent the data as drawings, picture graphs, dot plots (a.k.a. Line graphs or line plots) and with technology. Communicate observations. (MP3, MP5) # μ
6.1.1.4	Create a visualization about a data set to describe patterns, highlight relationships or illustrate features of the distribution of the data to answer or help answer their statistically investigative question. Visualizations should represent the data in appropriate ways, including tables, dot plots, stem-and-leaf plots, histograms and box plots while incorporating any other relevant information that helps to tell a story about the data. (MP5, MP6)
7.1.1.4	Understand that a set of data collected to answer a statistical question has a distribution that can be described by its center, variability and overall shape. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. Justify the choice of measures of center and variability, the shape of the data distribution and the context in which the data were gathered. (MP1, MP7)
7.1.1.5	Create a visualization about a data set, organizing and presenting the data in appropriate ways, including in tables, circle graphs and histograms, and incorporating any other relevant information that helps to tell a story about the data. (MP5, MP6) # μ
8.1.1.1	Formulate statistical investigative questions, such as questions about variation, the differences between groups and associations between two numerical variables. (MP3) ✜
9.1.1.9	Use statistics appropriate to the shape of the data distribution to compare the center and spread of two or more data sets. (MP4)
9.1.1.10	Create and analyze data displays, including scatter plots, histograms and boxplots using technology. (MP1) ☼
9.1.1.13	Analyze and interpret data using various measures, such as difference in shapes, center and spread to draw conclusions, identify trends and describe relationships, accounting for effects of extreme data points (outliers). (MP1) $

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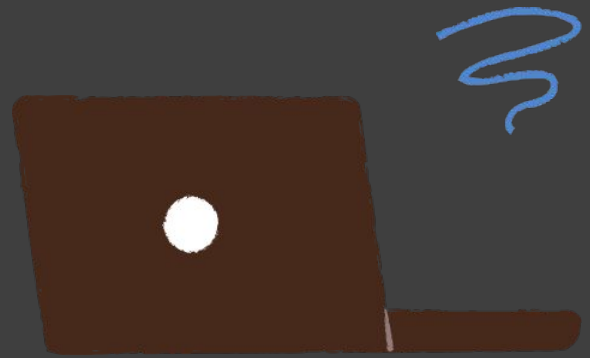
Analyze histograms to help investigate data

Distributions can be described with center, variability, and shape

Use shape of data to compare center and variability

What we know

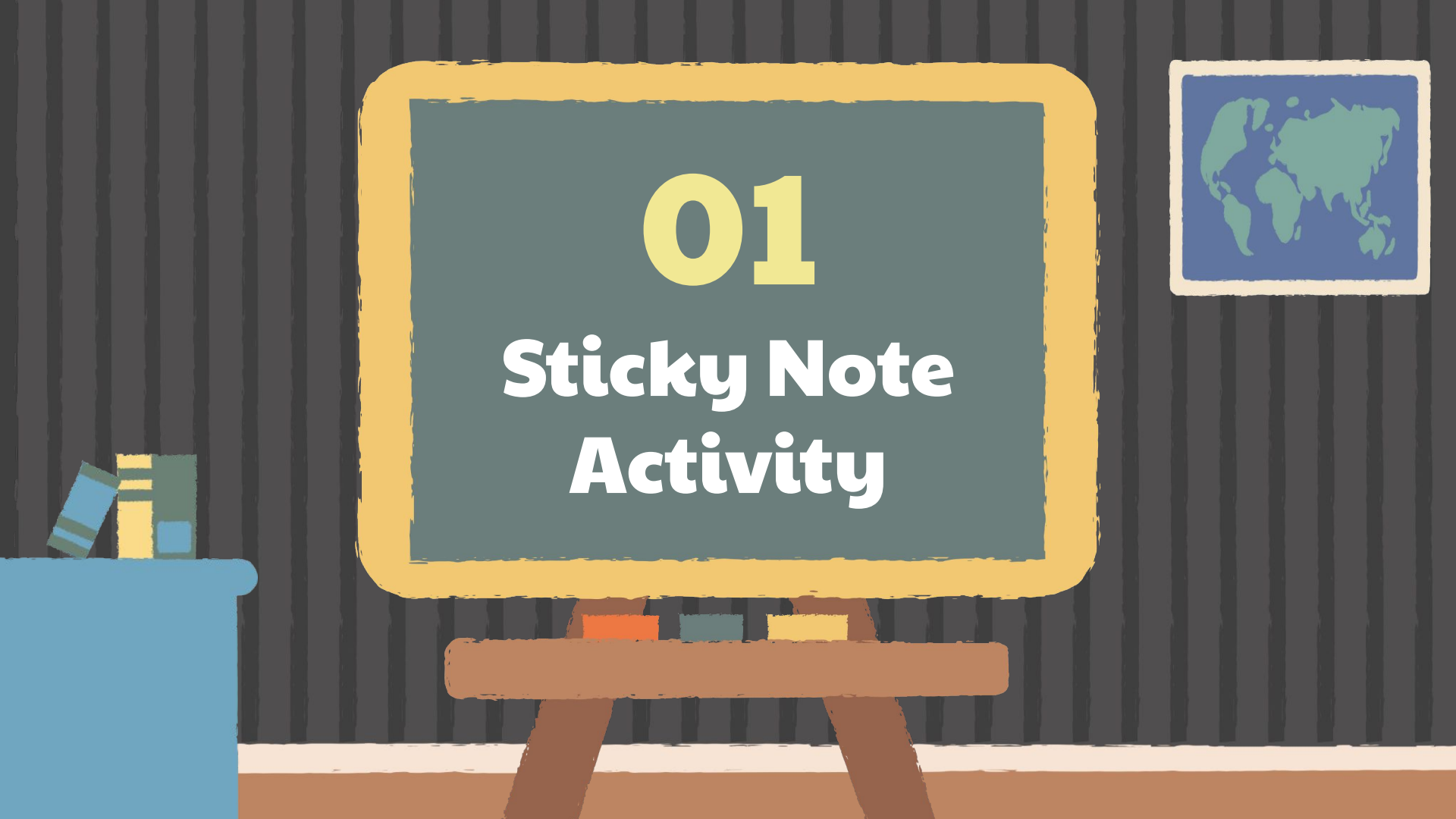
reasoning about distributions is hard



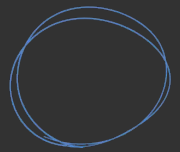
Trajectory for Distributions

1. Build up the idea of distributions as entities
2. Characterize these entities with shape, center, variability
3. Interpret histograms in context
4. Use to compare groups (informal inference)

Bakker, A., & Gravemeijer, K. P. (2004). Learning to reason about distribution. In *The challenge of developing statistical literacy, reasoning and thinking* (pp. 147-168). Dordrecht: Springer Netherlands.


01
Sticky Note
Activity

What percent battery do you have remaining on your phone?



You will be given a sticky note

Locate your remaining battery percentage

Record your percentage on your sticky note

What percent battery do you have remaining on your phone?

- Hold up your sticky note
  - As a "class" what is our average percentage battery remaining?
  - How variable is that percentage?

It's hard to tell! Distributions can help!

Bring your sticky note to the axes on the board

What percent battery do you have remaining on your phone?

- As a "class" what is our average percentage battery remaining?
- How variable is that percentage?

This collection of our points in a graph makes it easier to think of the data as **an entity: a distribution**

Distributions

- Characterized by:
  - Shape
  - Center
  - Variability

02

Sorting Histograms

Sorting Histograms

- You will be given a collection of 10 histograms
- Work with a group to sort them into groups based on similarities

Takeaway

- You might have sorted differently!
  - Students will too
- Starts them thinking about shape, center, and variability and they don’t even need formal terms about this yet


03
Matching
Histograms

Matching Histograms

- Work on the activity to match the descriptions to the histograms in your small groups

Takeaway

- Start to think more about context and interpretation at this point

04

Comparing Histograms

Comparing Histograms

- Work on the activity to compare histograms

Takeaway

- We can use distributions to make group comparisons focusing on what the shape, center, and variability tell us in context about the two groups

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Wrap Up & Resources

Anna Ferguson's Work

Greyscale photo activity. Click here for article and ideas!

Afternoon session: It's Raining Stats: Activities for Simulation and Inference

Gooseberry Falls 1
1:30-2:30pm

LASER website

Find these activities and more!

Thank you!

Slides from slides carnival