Data Science and Statistics

TIPS:

1. Don’t wait for an official unit.
Statistics units often fall at the end of the year, putting them at greater risk of being squeezed out. Third grades at Explorer Elementary in Michigan participate each fall in a data investigation (similar to a science fair project) to learn how to ask mathematical questions about data.

2. Leverage data science and statistics projects to reinforce other concepts.
For example, Georgia teachers use lizard habitat data to teach 8th grade algebra and science as well as statistics.

3. Encourage discussions.
Tennessee teachers developed interactive lessons to get kids talking more about data in the real world.

IN THE CLASSROOM

Dione Maxwell, the head of math curriculum and instruction at Loganville High School in Georgia, uses a regular skit from “The Tonight Show”—in which host Jimmy Fallon asks guests to take turns smashing eggs on their heads—to teach her students across grades about probability. Teachers can recreate the skit with plastic, confetti-filled eggs, a deck of cards, or a web-based simulation site. See sample here.

“At the beginning, they need to know, OK, there’s four raw eggs. I have a 4 out of 12 chance of getting a raw egg smashed on my head—but they also need to know that the probability changes every time an egg is chosen. So the kids then play the game using a simulation through the cards or a website. They come up with what the law of large numbers is, and we discuss it as a class, but it’s richer because they’ve discovered it, rather than me just telling them a definition of something,” Maxwell said.

K-12 STATISTICS AND DATA SCIENCE LESSON PLANS AND TOOLS:

Statistics Education Web: Includes lesson plans peer reviewed by the American Statistical Association, including Egg Roulette

Skew the Script: Teacher-developed lesson plans focused on social contexts, such as using school funding data to discuss random sampling and bias or data related to online dating profiles to show conditional probability.

StatsMedic: “Experience first, formalize later” middle and high school lesson plans, intended to encourage more student dialogue in math.

Slow Reveal Graphs: Elementary and secondary lesson plans and slide decks that allow a teacher to walk students through the information in complex data charts, including Jenna Laib’s country flag colors chart.

Common Online Data Analysis Platform: A free, web-based data tool for educators and their students.

Census at School: An international classroom data collaboration involving students in the United States and New Zealand, which allows students to generate and explore demographic and survey data on random samples of students for class projects.

GUIDANCE AND ARTICLES:

Catalyzing Change in Middle School Mathematics: The National Council of Teachers of Mathematics guide to research and pedagogy in math, it dedicates significant focus on integrating statistics and data science concepts.

Foundations of Data Science for Students in Grades K-12: The report from a 2023 National Academies of Science workshop, discussing the evolution of data science education and research on approaches.