Empowering Tomorrow's Data Detectives: Promoting Statistical Literacy and Engagement among Youth

2024 Research and Policy Conference, FCSM
Session E-2: Accessible Data for Young Learners:
Innovative Paths to Make Federal Data Relevant to Students
Wednesday, October 23, 2024, 10:30am

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Joshua DeLaRosa, National Center of Education Statistics

What is the Data Detectives Camp?

- Established in 2016, the camp is a science, technology, engineering, and math (STEM) camp
- Focuses on statistics for middle school students
- Teaches statistics through a variety of fun, hands-on activities
- There is no fee for registering or attending the Camp
- Offered as a one-week summer camp

Partners / Sponsors

- Conducted by the National Center for Health Statistics (NCHS), CDC in collaboration with various statistical organizations, universities, and federal agencies.
- These partnerships have helped develop and grow the camp.
- New partners continue to join as they see the value of the Data Detectives Camp and its contribution to helping students understand statistics and become good consumers of data.

Partners since 2016:

ASA American Statistical Association — Promoting the Practice and Profession of Statistics

CDC Museum Disease Detective Camp

Joint Program in Survey Methodology

University of Maryland | School of Public Health — Advancing a Better State of Health

Partners since 2017:

BJS Bureau of Justice Statistics

Partners since 2018:

BLS

Partners since 2020:

University of Maryland Social Data Science Center

Partners since 2023:

NCES National Center for Education Statistics

Our Staff

- Dr. Ryne Paulose, Christine Jones, Dr. Gladys Martinez, Juliana McAllister of NCHS are the primary camp instructors.
- However, multiple volunteers from NCHS, CDC, and partner organizations work as camp counselors and assist with camp lectures and activities during the week.

Ryne Paulose, PhD, MA
Camp Director | Instructor

Christine Jones, MS
Director of Communication | Instructor

Gladys Martinez, PhD
Director of Curriculum | Instructor

Juliana McAllister, MA
Director of Logistics | Instructor

NCHS Data Detectives Camp

Flexible Partnership Model

Partners contribute in different ways

Staff (General)

- Assist in developing logistical procedures for camp
- Provide logistical support the week of camp with managing campers, extracurricular activities, and more
- Assist with processing 100+ applications the week after applications close

Staff with Statistical Expertise and Educational Background

- Assist in developing lectures and statistical activities
- Participate on the Application Committee and review blinded applications 1-2 weeks after application period closes
- Assist as camp counselor (M-F, 9am -4pm)

Financial Assistance

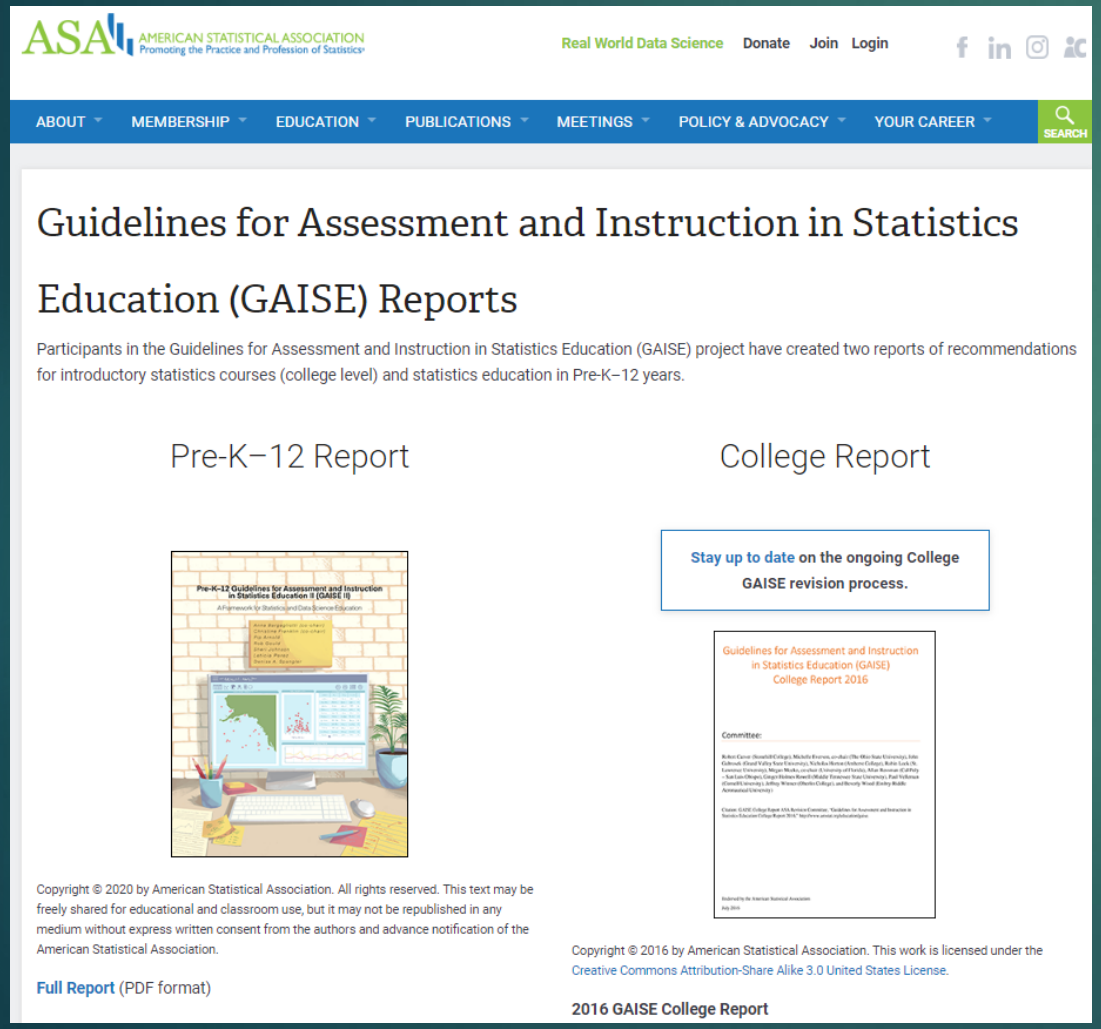
- Purchase camper t-shirts
- Purchase camper snacks
- Ice-cream social
- Pizza party
- Camp materials

Teaching Statistics

- Statistics and probability concepts are included in K–12 curriculum standards.
- Camp curriculum is based on **Common Core Standards**[1] for Middle School.
  - Grade 6 – Distributions / Statistical Variability
  - Grade 7 – Comparing Populations / Random Sampling
  - Grade 8 – Bivariate Associations
- Camp activities cover concepts developed in grades 6 and 7 and teach kids to think like a Data Detective: Ask the right question, collect the needed information, analyze the data, and display the results.

[1] https://corestandards.org/wp-content/uploads/2023/09/Math_Standards1.pdf

Guidelines for Assessment and Instruction in Statistics Education (GAISE)



I. Formulate Questions

→ clarify the problem at hand

→ formulate one (or more) questions that can be answered with data

II. Collect Data

→ design a plan to collect appropriate data

→ employ the plan to collect the data

III. Analyze Data

→ select appropriate graphical and numerical methods

→ use these methods to analyze the data

IV. Interpret Results

→ interpret the analysis

→ relate the interpretation to the original question

https://www.amstat.org/education/guidelines-for-assessment-and-instruction-in-statistics-education-(gaise)-reports

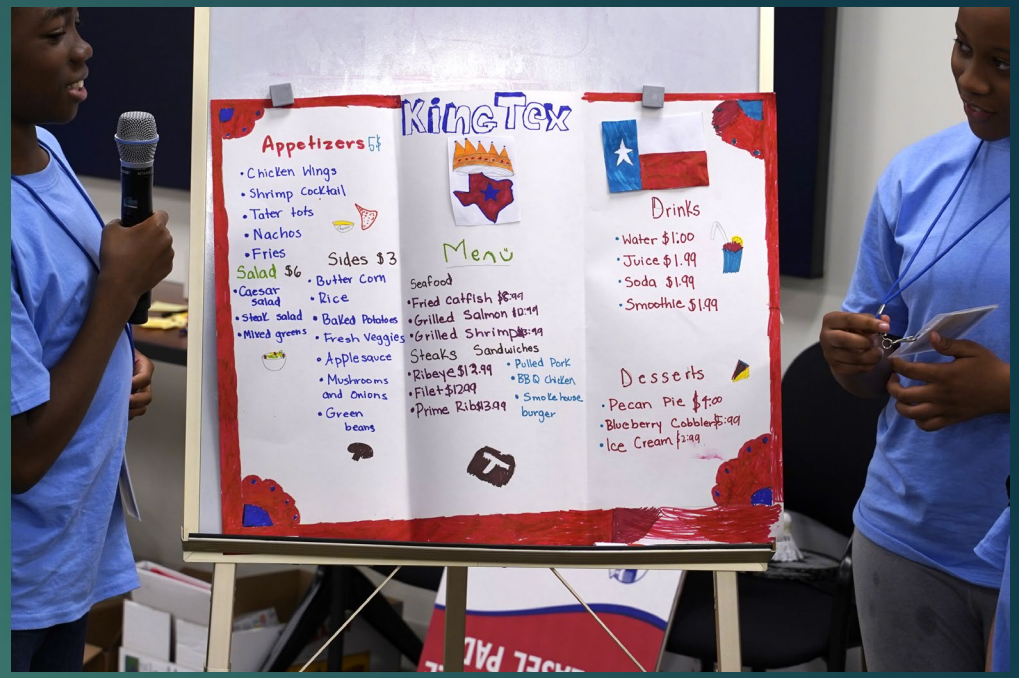
Statistical Activities

- Continuous Data – foot length, jump distance,
- Solving a case using data

MONDAY: Distributions	TUESDAY: Comparing populations	WEDNESDAY: Bivariate association	THURSDAY: Probability
Activity: The footprint on the sidewalk **Formulate Q:** Have class ask questions @ arm span. [Discuss how to ask a statistical question]. **Collect Data** Have each group determine how they will collect data on foot size.	Recap of previous day's activities (5 mins) **Activity:** Continue with Gymkana activity from Monday - Time on Balance beam and Time hanging from parallel bars (Formulate Q and Collect Data already done). (30m) **Analyze and Display Data:** Each group will	Recap of previous day's activities (5 mins) **Activity: Foot Length & Time on parallel bars (45m)** **Formulate Q:** have class pose questions @ relationship btn arm span & time. E.g., does longer arm span mean longer time? [Discuss	Recap of previous day's activities (5 mins) Introduction of simple probability concepts: Describe basic concepts (15 mins) Question(s) of the day (?) Activity: ask students to determine the

Statistical Activities

- Categorical data – Food Preferences
- Creating a food menu for middle school aged children
- Use Census@School to examine state variation



MONDAY: Distributions	TUESDAY: Comparing populations	WEDNESDAY: Bivariate association	THURSDAY: Probability
Activity: FOOD PREFERENCE **Formulate Q:** Have class ask questions @ food preference. [Discuss how to ask a statistical question; discuss the variables; how do response options differ from morning]. **Collect Data** Have each group determine how they will collect data on food	**Activity:** Repeat with Vegetarian status, if time permits. **Activity:** Each group colors their map on the top 3 foods for their states	**Activity: Describing relationship by exploring other factors**) **Formulate Q:** What factors are related to the differences seen in food preference by state? **Analyze & Display data:** Posterboard with columns for categories of explanatory	Recap of previous day's activities (5 mins) **Activity:** Restaurant menu **Formulate Q:** have class brainstorm on what they've learned that could be used to develop the ideal menu for middle schoolers **CHALLENGE:** Job (should you choose to

Federal Data Integrated into Camp Lectures

Health surveys and vital statistics

Family Growth Survey
Fertility, family formation, and reproductive health

NSFG
National Survey of Family Growth

Health and Nutrition Examination Survey
The only national survey with health exams and lab tests

nhanes™

Health Care Surveys
Monitoring healthcare use, access, and changes over time

Health Interview Survey
The nation's oldest and largest household health survey

National Health Interview Survey
Since 1957

Rapid Surveys
Getting the right data in the right hands at the right time

NCHS Rapid Surveys System

Vital Statistics
The most complete data on U.S. births and deaths

NVSS™
National Vital Statistics System

Other Camp Activities

Modified Gymkana

Ben Prescott, Assistant Director and Coach, had campers obtain measurements on timed planks, standing jumps, and grip strength.

NHANES Exam Center

Infectious Disease Epidemiologist, Dr. Geraldine McQuillan talked to students about NHANES ; NHANES Engineer, Vera Osidach provided tour of mini-MEC.

Graphic Artists

NCHS Office of Information Services (Tommy Siebert / Dottie Day) showed how the NCHS graphic artists develop posters and other visuals for scientists.

Toastmasters

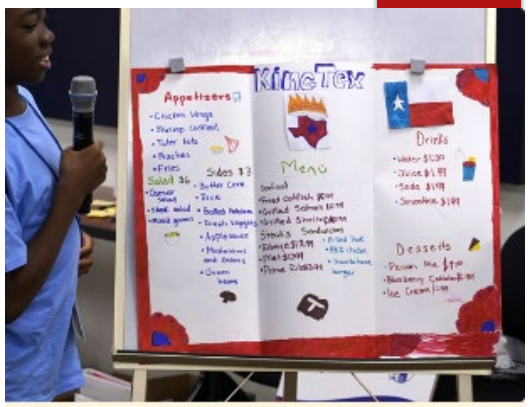
Toastmasters member and Research Scientist, Renee Gindi, presented on tips to orally present your work.

The Farm at UMD's College of Agriculture & Natural Resource

Note: Some modifications were made for virtual camps from 2020-2022

Final Day of Camp

- Team Presentations – based on Census@School data analysis
- Jeopardy – a fun way to review material learned during the week
- Awards for top presentations
- Pizza Party and Ice Cream Social
- Certificates of Completion - presented by NCHS Director
- Photos and Campers signing Camp T-Shirts



NCHS Data Detectives Camp

Note: Some modifications were made for virtual camps from 2020-2022

2016, School of Public Health, UMD

2017, School of Public Health, UMD

2018, National Center for Health Statistics, CDC

2019, National Center for Health Statistics, CDC

2020, Zoom (1st Virtual Camp)

2021, Virtual Camp

Our Campers

- Since 2016, the Data Detectives Camp has educated more than 300 children from across the United States.
- In 2022, via our virtual camp, we had our first camper living outside the U.S. join us for the week.

"It was challenging and fun for my son. It also gave him a greater exposure to data and statistics." – 2021 Parent

"I enjoyed learning from teachers who work at NCHS because they have a lot of knowledge about statistics." – 2022 Camper

"I didn't want it to end." – 2020 Camper

"I have already recommended this camp." – 2022 Parent

Two locations in 2024

NCHS Data Detectives Camp

Contact

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Website: [Data Detectives Camp - Homepage (cdc.gov)]