08 Data Science - Skin Tones and Representation

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **4 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

This course combines the study of Statistics and Probability with Data Science. The goal is to have students think critically about data in today's data-driven world and understand its role in the 21st Century economy. Furthermore, students will become familiar with the concepts, topics, and techniques used by data scientists and statisticians in their day-to-day work.

Throughout this course, students will engage in project-based observational studies and experiments to develop their understanding of data analysis, sampling, correlation/causation, bias and uncertainty, probability, modeling with data, as well as making and evaluating data-based arguments. Students will also learn about the roles of data scientists, the power of data in society, machine learning, and how data scientists extract knowledge and insights from real-world data.

In this unit, students explore the issues around skin tone representation in the media through a data-based exploration of skin tone representation in magazines. Students conduct both a categorical and numerical analysis and compare the benefits and drawbacks of both. In their categorical analysis, students create two-way tables based on their interpretation of the skin tones of the people pictured, and in the numerical analysis, they use the RGB values of the images themselves. After both analyses, students chose an audience for whom the information would be relevant and write a data-supported piece to share their findings with that audience. During the unit, students will work in Google Sheets and Google Colab (Python).

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Essential Questions

- How can I gather data to analyze skin tone representation in the media and present my findings in a coherent article?

Enduring Understandings

- There are varying levels of representation of people with varied skin tones in the media
- Using categorical and quantitative data, we can analyze the information provided and offer an analysis of our findings.

CONTENT AREA STANDARDS

S.ID

A. Summarize, represent, and interpret data on a single count or measurement variable

B. Summarize, represent, and interpret data on two categorical and quantitative variables

C. Interpret linear models

S.IC

A. Understand and evaluate random processes underlying statistical experiments

B. Make inferences and justify conclusions from sample surveys, experiments, and observational studies

S.CP

A. Understand independence and conditional probability and use them to interpret data

B. Use the rules of probability to compute probabilities of compound events in a uniform probability model

S.MD

A. Calculate expected values and use them to solve problems

B. Use probability to evaluate outcomes of decisions

MA.S-ID.B.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
MA.S-ID.B.6b	Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology.

MA.S-MD.B.7	Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

9.1.12.PB.6: Describe and calculate interest and fees that are applied to various forms of spending, debt and saving.

LA.RI.11-12.7	Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
LA.11-12.SL.11-12.2	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand that:

- There are varying levels of representation of people with varied skin tones in the media.

Procedural Knowledge

Students will be able to:

- Explore online magazines and discuss features of the different magazines available.
- Decide on categories in which to use to sort their data.
- Categorize the data into two-way tables.
- Consider each color in the RGB color space as a point 3D space representing each individual's skin tone.
- Plot the points on a scatter plot and analyze the plots.
- Use a Colab to 'cluster' their data and create bar graphs based on their cluster.
- Write summary statements about skin tone representation based on their visuals.
- Discuss what their analyses reveal about skin tone representation in magazines.
- Write an article sharing their learning with an audience of their choice.

EVIDENCE OF LEARNING

Alternate Assessments

- Portfolios

- Verbal Assessment (instead of written)

- Multiple choice

- Modified Rubrics

- Performance Based Assessments

Formative Assessments

Observations

Task completion

Student journals and notebooks

Cooperative team work

Summative Assessments

PBL Assessment

Unit assessments

RESOURCES (Instructional, Supplemental, Intervention Materials)

You cubed curriculum

Unit 5 resources: https://hsdatascience.youcubed.org/curriculum/

INTERDISCIPLINARY CONNECTIONS

Educational tech applications

Current Events

Experimentation

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.