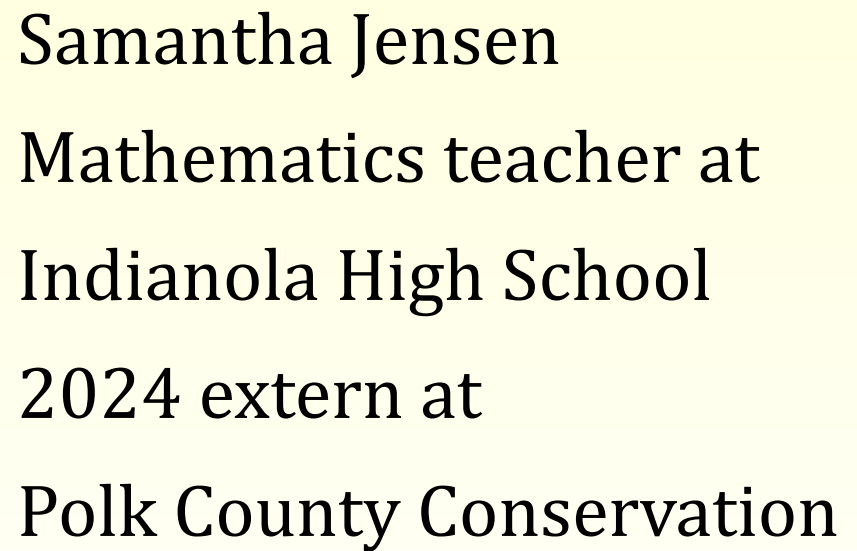




Part I: Overview of Workplace

The Polk County Conservation Board manages over 16,000 acres of prairies, wetlands, woodlands, trails, and parks in Iowa's most populated county. The board aims to develop and maintain areas for conservation and public recreation. It offers year-round education and recreation programs, volunteer opportunities, and excursions. Highlights include the Jester Park Nature Center, an 18-hole championship golf course, multi-use trails, and activities like horseback riding, fishing, camping and paddling. Polk County Conservation's mission is to provide quality outdoor recreation, conservation education, and long-term protection of the county's natural heritage.

Part II: Workplace Focus

During my externship at Polk County Conservation (PCC), I collaborated with the Sustainability Committee to assess utility usage across all PCC parks. Using my background in statistics, I gathered, organized and displayed data on electric and water usage in park buildings and facilities. I began by utilizing Energy Star's Portfolio Manager to organize data and track building energy performance. Next, I focused on documenting water usage for all PCC facilities using a comprehensive Excel spreadsheet. Working closely with administrative and maintenance teams, I supported PCC's Sustainability Initiative aiming to reduce environmental impact through energy efficiency, renewable energy adoption, and water conservation. My work will aid PCC in advancing sustainability goals and promoting environmental consciousness among Polk County residents.

Part III: Introduce the Project or Problem

Essential Questions: What is the quality of the water around us? How can we best organize, display and interpret water quality data using Excel or Google Sheets to answer this question?

Using real data sets obtained from Polk County Conservation, the DNR, the EPA, and other contributors, students will sort, organize, display, and interpret data to assess water quality in Warren and/or Polk counties. This investigation will require skillful use of Excel or Google Sheets, as well as research into water contaminants such as nitrates, salt chlorides, dissolved oxygen, and more.

This 2-3 day project will culminate in a presentation, in which each student will share his/her findings with the class.

Part IV: Standards, Driving and Essential Questions

Iowa Academic Standards

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Part IV (cont.): Standards and Essential Questions

Iowa Academic Statistics and Probability Standards

Interpreting Categorical and Quantitative Data

- Summarize, represent, and interpret data on a single count or measurement variable.
- Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

Essential Questions

- What is the quality of the water around us?
- How can we best organize, display and interpret specific water quality data using Excel or Google Sheets to answer this question?

Part V: Instruction, Scaffolding and Differentiation

In-Class Instruction:

Before starting the project, students will receive instruction on various types of graphical displays and their primary applications. Instruction will include lecture, modeling, whole-class discussion, and homework assignments.

The following graphical displays will be included: line graphs, bar graphs, pie charts, scatterplots, frequency distribution tables and graphs, line plots, stemplots, and boxplots

* It is also important to note that all students must complete a prerequisite course in Microsoft Office, which includes basic spreadsheets and PowerPoint presentations, prior to enrolling in Statistics class.

Part V: Scaffolding and Differentiation

Project Benchmarks:

1. Each student will receive large data sets containing various water sample results from the past 20+ years from Polk and Warren counties.
2. Students will choose one sampling location and 1-2 components on which to focus for their project.
3. Students will sort and display this data in a meaningful way, including a graphical representation.
4. Students will research the chosen component(s) and interpret what the data reveals about water quality at the selected location.
5. Students will present their findings to the class using PowerPoint or Google Slides.

Part V: Scaffolding and Differentiation

Skills necessary for success:

- Proficiency in Excel or Google Sheets, including sorting, subtotaling, and creating graphs.
- Ability to appropriately select and interpret various graphical displays.
- Research skills to investigate water components such as nitrates, salt chlorides, dissolved oxygen, phosphates, pH, turbidity, E. coli, and their effects on water quality.
- Presentation skills, including the ability to create and deliver PowerPoint or Google Slide presentations effectively.

Part V: Scaffolding and Differentiation

Differentiation:

I will provide individual support to students who may be struggling with:

- selecting a location and/or component.
- various spreadsheet operations.
- selecting an appropriate graphical display.
- researching and interpreting how the chosen component(s) affect water quality.

Part VI: Extern Host Role

My externship host at Polk County Conservation was Ginny Malcomson, the Water Quality Coordinator and co-chair of the Sustainability Initiative Committee. Ginny has been instrumental in providing water quality data sets and will serve as a valuable resource for students during our class projects, offering guidance and expertise on the components of the water sampling data. Additionally, if time allows, she is eager to visit the classroom to provide feedback when students present their findings.

Part VII: Final Thoughts

Beyond the statistical skills developed in this project, I hope that this project will ignite a passion for water conservation among my students and foster a deeper awareness of the environmental issues surrounding them. By engaging with the data and exploring the significance of water quality, I believe they will develop a greater understanding of their impact on local ecosystems. Ultimately, my goal is for this experience to inspire them to become proactive stewards of the environment, equipped with the knowledge and motivation to make positive changes in their communities.