Teacher's Name: Ticey Little

Domain: Exploring Computer Science

Date Range: April 21, 2025 – April 25, 2025

ACOS Standard:

32 - Use data analysis tools and techniques to identify patterns in data representing complex systems.

Student Friendly Outcome:

Unit 4: Data & Computing

I CAN collaborate with group members to create effective prompts for a survey about the Final Project.
I CAN utilize tools to create an electronic survey to collect data.
I CAN determine if questions are easily understood.
I CAN predict how useful the data would be in answering the research question.
I CAN understand the goal of answering the research questions.

Monday	Tuesday	Wednesday	Thursday	Friday
Teacher Absent	Journal entry (10 minutes) Think Pair Share: Researching Photos (20 minutes) Discuss project (5 minutes) Groups planning time (20 minutes)	Dollar Street Investigation (25 minutes) Groups research project (30 minutes)	Journal entry (10 minutes) Hospitals and Communities Site Preview (20 minutes) Hospitals and Communities Presentation (20 minutes) Wrap up (5 minutes)	Med-PaLM, our expert-level medical LLM|Research MedPaLM (5 minutes) US Health Presentation (25 minutes) Gallery Walk Presentations/ Discussions (20 minutes) Wrap Up (5 minutes)

Instructional Lesson # 4. Day 6

Topic Description: In this lesson, students work together in the role they have been assigned and take on their responsibility to work through understanding the goal of answering the research questions. Create meaningful and effective survey prompts. Students will implement guidelines from the US Census Bureau and construct an electronic survey.

Objectives:

The student will be able to:

- Collaborate with group members to create effective prompts for a survey about the Final Project.
- Utilize tools to create an electronic survey to collect data.
- Determine if questions are easily understood.
- Predict how useful the data would be in answering the research question.
- Understand the goal of answering the research questions.

Outline of the Lesson

Segment	Reason/Purpose
Journal entry (15 minutes) Review of US Census Bureau Resource: Measuring Maternal Mortality (5 minutes) Group activity: creating survey prompts using guidelines. (20 minutes) Creating electronic survey (15 minutes)	Discuss important factors presented in the resource document. Investigate survey tools. Communicate final project guidelines. Groups identify specific variables and develop data collection survey questions.

Student Activities:

- Complete Journal entry.
- Review and discuss Measuring Maternal Mortality.
- Project Groups create survey prompts using guidelines.
- Review the traits of “good” questions for effective surveys.
- Groups create electronic survey

Teaching/Learning Strategies:

Students should plan to collect some data prior to Day 7 and then before day 8 data check-in to use as a base for discussion.

- Journal Entry**:** *Groups identify specific variables and develop data collection survey questions.*
    - Review the traits of “good” questions for effective surveys that will reveal the information needed to answer research questions.
    - Explain to students that everyone in the group is accountable for the work on the various stages and that they need to alternate roles. They also need to come to consensus on decisions related to data collection, questions for analysis, etc.

    - Provide students with dates for the data check-ins/analysis with their own data. (These may need to be revised if sections take longer than anticipated.) Students should plan to collect some data prior to Day 7 and then before day 8 data check-in to use as a base for discussion.
    - Identify research questions or describe the stories or discoveries that can be made through analysis of data. It is important that every group member contributes a few ideas before the group refines the ideas and selects, by consensus, one or two research questions.
    - Groups identify the specific variables needed to analyze the data in order to answer their research questions.
- Think-Pair-Share:
    - Journal Entry: *Students will brainstorm, making a list in their journals.*
    - Pair: students will share either lists with an elbow partner
    - Share: Teacher will facilitate a round-robin, with each pair providing a response. Teachers will write these on the board. As a class, discuss what each guideline means.
- Review or Measuring Maternal Mortality
    - Remind students of previous discussion
- Survey Tool Presentation
    - Teacher will demonstrate how to use the survey tool to create their surveys. A link to creating a survey in Google forms is provided in the resources, but any survey tool that you have access to will work.
- Group Work
    - Groups will begin researching and investigating effective prompts for their project.
    - They will record these prompts using the electronic survey tool of choice. (See example in resources.)
    - Groups evaluate the effectiveness of the initial survey questions.
- Data Collection - Students will use the last part of the class to collect data for Final Project
    - Class will review the data collection guidelines. Note: Remind students each day of the unit that they should be continuing to collect data.

Resources

- Measuring Maternal Mortality: ISSUES TO CONSIDER IN QUESTIONNAIRE DESIGN; U.S. Census Bureau [https://www.census.gov/content/dam/Census/programs-surveys/international-programs/stic/maternal-mortality-english.pdf]
- Google Forms: Creating a survey. [https://support.google.com/surveys/answer/2372144?h

Teacher Reflection Notes

Instructional Lesson # 5. Days 7-8 Using Photos as a Data Source

Topic Description: Using Photos as a data source.

In units 1 and 2, we investigated the meaning and nature of data that surrounds us in our daily lives. We analyzed and discussed how that data affects our communication and daily decisions. We looked at how our lived experiences shape a lens through which we see and perceive data and the stories it may tell. In most cases we have focused on data which exists on a device, online, or a spreadsheet as text and numbers; things we think of as measurable. However, data exists in other forms such as images, sounds, and even smells. This lesson provides an opportunity for students to explore commonalities and differences of cultures and global communities by using images as a data source to communicate these stories.

Objectives

The student will be able to:

- Analyze and interpret non-traditional data sources.
- Students will be able to identify and comprehend the various forms of data, including images, sounds, and smells, and understand how these non-text and non-numeric data types can convey information and stories.
- Explore the impact of data on communication and decision-making.
- Students will be able to recognize and discuss how data, in its various forms, influences the way we communicate and make daily decisions.
- Apply data analysis techniques to tell stories about their communities.

Outline of the Lesson

Segment	Reason/Purpose
Day 1 Journal entry (10 minutes) Think Pair Share: Researching Photos (20 minutes) Discuss project (5 minutes) Groups planning time (20 minutes)	Analyze and interpret photos/images as data sources Groups choose a project idea/theme and make a plan
Day 2 Dollar Street Investigation (25 minutes) Groups research project (30 minutes)	Reactions to Dollar Street What did they learn from the photos Groups work together on their project idea

Student Activities:

Day 1

- Complete Journal Entry.
- Research photos.
- Students analyze photos and record a description.
- Discuss the final project.
- Groups select a project theme.

Day 2

- Investigate Dollar Street (See resources.) a website to help anyone to understand the world through photos. (25 min) Show TED Talk by Anna Rosling Rönnlund creator of Dollar Street.
- Students return to their groups to continue work on their projects. (30 min)

Teaching/Learning Strategies

Day 1

- Journal Entry: "*A picture is worth a thousand words.*" *What does this mean to you? When have you heard it?*
  A photo/image can have a greater impact than words or numbers. An example is 1 billion dollars. We hear "a billion dollars" so frequently in the media so often now, it seems very normal. But, how big is a billion dollars actually? Have students do an image search to find out.
    - A photo/image can communicate multiple meanings and ideas.
- Researching Photos
    - Find a free and royalty free photo to show the students.
    - Ask each student to write a quick description about what they see and what they think the photo is communicating.
    - Do a quick share out. Are there any common themes from the responses? What additional information is communicated by the photo?
    - With an elbow partner, have students find a photo they feel *conveys a thousand words*.
        - Partners will write a description of what the photo shops and other information or meaning the photo conveys.
        - Have partners share their image and comments with the class. After each presentation, ask if any students see a different or additional message.
- Teacher will present the project assignment.
    - Photos As Data Project
        - Groups will decide on a topic to investigate and collect or record their own photos about the topic. Topics might be the Unit 2 Final Project on a Community Issue, an analysis of a topic of concern (famous person, historical event, specific location of note), or a school interest.
        - Groups will collect images from online, newspaper archives, or record their own. Groups may choose to create a slide presentation, a poster, website, or video.
    - Teacher will monitor student groups answering questions and helping groups decide on a topic.

Day 2

- Investigate Dollar Street (See resources.) a website to help anyone to understand the world through photos.
    - Show TED Talk by Anna Rosling Rönnlund creator of Dollar Street. (See resources.)
        - Possible TED Talk discussion prompts:
          1. How do the images and perceptions of the world we see in the media influence our understanding of global income disparities and living conditions?

2. What insights can we gain from comparing everyday items in homes across different income groups and countries, as shown in the Dollar Street project?
3. How does it challenge stereotypes and preconceived notions about different cultures?
4. How does the use of visual data, such as photos and videos, enhance our understanding of global living conditions, income levels, and daily life? What are the advantages and limitations of using visual data in this context?
5. In what ways can the Dollar Street project be used to promote empathy and understanding between people of different backgrounds? How might it inspire action or change in the way we perceive and address global issues?

- Students return to their groups to continue work on their projects.
    - Groups should focus on what type of images they need to collect: from the internet, newspaper archives, or capturing their own images and video.

Resources

- Dollar Street: https://www.gapminder.org/dollar-street
- TED Talk by Anna Rosling Rönnlund creator of Dollar Street: https://www.ted.com/talks/anna_rosling_ronnlund_see_how_the_rest_of_the_world_lives_organized_by_income

Teacher Reflection Notes

Instructional Lesson # 6. Days 9–10

Topic Description: Using data to solve problems. This lesson is reflective of Unit 2 Problem Solving process Lessons. Students will understand the importance of data and how it contributes to the problem-solving process. Groups will evaluate rural and urban medical facilities comparing contrasting data. Analyze data and develop artifacts then present their findings.

Objectives:

The student will be able to:

- Understand the complexities of collecting, processing, and analyzing data sets.
- Identify the specific variables needed to analyze the data
- Interpret data and draw conclusions to solve problems
- Identify stakeholders and issues of particular populations
- Understand the problem-solving process

Outline of the Lesson

Segment	Reason/Purpose
Day 1 Journal entry (10 minutes) Hospitals and Communities Site Preview (20 minutes) Hospitals and Communities Presentation (20 minutes) Wrap up (5 minutes)	Students will reflect on previous lessons and form conclusions. Understand the problem-solving process Acclimate students to the data. Evaluate the data and draw a conclusion Interpret data and design artifact Collect thoughts and materials
Day 2 Med-PaLM, our expert-level medical LLM|Research Med-PaLM (5 minutes) US Health Presentation (25 minutes) Gallery Walk Presentations/ Discussions (20 minutes) Wrap Up (5 minutes)	Understand the complexities of collecting and using data to solve problems Evaluate the data and draw a conclusion Interpret data and design artifact Review visual interpretations of different states Discuss findings

Student Activities:

Day 1

- Complete journal entry.
- Hospital and Communities Site Preview
- Present Hospital and Communities project.
- Participate in wrap up

Day 2

- Watch Med-paLM Video.

- US Health Presentation
- Participate in gallery Walk Presentations/Discussions
- Participate in wrap up (5 min)

Teaching/Learning Strategies

- Journal entry: *How can you use data to find solutions?*
    - As students reflect on the journal prompt, discuss possible racial disparities and socioeconomic factors.
- Hospital and Communities Preview
    - Intro: Provide the Rural Health Information Hub (See resources.)
    - Select the Topic & States tab,
    - select Healthcare Access in Rural Communities link,
    - Allow students a few mins to read the page. You may ask students to take note of the frequently asked questions sections.
    - Briefly discuss how this problem could be solved?
- Hospitals and Communities Presentation
    - Create poster presentation
    - http://www.ruralhealthinfo.org
    - Each group must prepare a poster representing their thoughts on the State's rural healthcare system. Assign states to groups and allow each group to complete
    - Select the Topic & States tab, then select State Guide, choose State. Posters should reflect their view on the state's current healthcare systems and how to solve the problem. Encourage students to be original as the differences should all reflect different interpretations and approaches to solving the problem. Point back to Unit 2.
- Wrap up today's activities

Day 2

- Google Palm Video (See resources.)
    - Students should keep in mind the benefits and issues that may arise from this technology. The video should be shown before assigning the presentation.
- US Health Presentation
    - Reflecting on yesterday's lesson, divide the class into small groups.
    - Provide the link to either US Pregnancy Related Deaths or AI told me I had cancer (See resources.)
    - Poster should address the problem and a possible solution. Students are encouraged to review the page and present their findings and representation on the poster.
        - Questions Who, What, How should be answered. Students can present their data as images, tables, text, etc. Search US Pregnancy-related deaths on The Rise, July 2023 or see resources for link.

            U.S. pregnancy-related deaths on the rise | NHLBI, NIH
- Gallery walk review and discussion
    - Groups will present their posters on the walls allowing students to view each other's work leaving comments on sticky notes. Teachers should encourage students to leave notes about the state's healthcare system or evaluate or grade. Groups share out and discuss. Allow each group to discuss their findings.

- Journal entry: *What new knowledge was gained from interpreting data? Do you see any connections with your final project?*
- Wrap-up and closing
    - Show students a map of a metro city's area hospitals and clinics (example: Chicago. See resources.) What stood out or is significant about the data?
    - What does the data on the screen mean?

Resources

- https://www.nhlbi.nih.gov/news/2023/us-pregnancy-related-deaths-rise
- Med-PaLM, our expert-level medical LLM|Research Med-PaLM (https://youtu.be/k_-Z_TkHMqA?si=1Q1RldBpk3DwCT6O)
- AI told me I had cancer (https://www.wired.com/story/artificial-intelligence-cancer-detection/)
- U.S. pregnancy-related deaths on the rise | NHLBI, NIH (https://www.nhlbi.nih.gov/news/2023/us-pregnancy-related-deaths-rise)
- http://www.ruralhealthinfo.org
- https://data.hrsa.gov/maps/health-equihttps://youtu.be/k_-Z_TkHMqA?si=1Q1RldBpk3DwCT6O)ty
- https://www.kff.org/statedata/

Teacher Reflection Notes

Instructional Lesson # 7. Days 11-12

Topic Description: This topic will equip you with the essential skills to transform raw data into map visuals, revealing hidden patterns and insights. Visualizing data with maps is a skill that is essential for various fields, including urban planning, public health, marketing analysis, environmental science, and more. This topic will empower you to tell compelling stories with maps and data.

Objectives

The student will be able to:

- Translate addresses into latitude/longitude.
- Sort files of data.
- Create subsets of data.
- Read location data from a file and plot points on maps.

Outline of the Lesson

Segment	Reason/Purpose
Day 1 Journal entry (10 minutes) Think-Pair-Share: Location data: maps, data sets, longitude and latitude, metadata included in photos (15 minutes) Introduction to creating a Google Map layer from a Google Sheet, from a CSV file (30 minutes)	Think-Pair-Share; reflect on experiences reading map visualizations and data Brainstorm various ways to find locations in your neighborhood, on your phone, and on a map. What data is needed/helpful By investigating layers in Google Maps, students will learn how to create their own maps
Day 2 Adding images to a map layer (25 minutes) Pinning information to a map using longitude and latitude. (30 minutes)	Students will practice creating a layered map by pinning images to a Google Map. They will use metadata from their own photos. Students will use either Google Sheets or MSExcel to create a map using an existing data set which includes longitude and latitude data.

Student Activities

Day 1

- Complete Journal Entry.
- Think-Pair-Share: Map Location Brainstorming.
- Create Google Map layers by pinning locations to a Google map from an open data source.

Day 2

- Investigate information available on Google maps.
- Create a map layer about a topic of their choice.

Teaching/Learning Strategies:

Day 1

- Complete Journal Entry: *Consider the data that you have been collecting. How might seeing the data on a map help you analyze it?*
- [NOTE] Before beginning this activity, become familiar with Google My Maps. (See resources.) This may require you to have a Google Gmail account.
- Think-Pair-Share: Map Location Brainstorming
    - Ask students to write down the types of information they might need to find a location on a map. This may include locations in the school, community, city/town, state, etc.
        - Location data may include: maps, GPS apps and devices, data sets, longitude and latitude, metadata included in photos, etc.
    - Share with a partner
    - Partners share with the class
- Creating map layers in Google maps.
    - Students will investigate how to add (pin) locations to a layer in Google maps by importing longitude and latitude data from a csv file, gathering location metadata from photos, and using street addresses.
        - Many municipalities, counties and states post open data sources online for the public. Before the lesson, locate several of these open-source sites and identify a variety of files containing longitude and latitude data to use for demonstration with the class.
        - Student investigation
    - While working with a partner, have students research an open data source of interest containing longitude and latitude information. Students will create a map layer and place the location data on the map.

Day 2:

- Adding images to a map
    - Using Google (or any available browser), ask students to do a search for their home address and locate the pin on the Google map. What happens when they mouse over the pin? What happens when they click on the pin? What information is available about their home address?
    - Now ask students to do a search for a specific type of place in your community or city. For example, students might search for city parks, a fast-food chain, grocery stores, schools, movie theaters, etc. Encourage students to search for an item that will have multiple instances in your community or city. What information is available when they mouse over the pin or click on the pin? Do other types of businesses/locations appear on the map? What are they? Why do you think they were included in your search?
- Pinning images to a map
    - Ask students to collect at least 4 photos of favorite locations in their communities. Add them to a layer on a Google Map. Add information to the map pins about the location and why it is a favorite place. Show students how to save the maps. Are they able to share the maps? Ask students what kind of maps they might make and share?
    - Extra Fun: Ask students to pretend they are going on a trip to another city/country. Have students create a map of sites they will want to visit.

Resources

- Google Maps (https://www.google.com/mymaps)