Collect, Organize, Represent Data – Grade 2, Level 4

Lesson Overview

In this lesson, students will collect, organize and represent data using bar graphs and picture graphs to display student favorite lunch choices and connect this data to the social studies concept of explaining how people's purchasing choices determine what goods and services are produced. Students develop a written presentation to the cafeteria manager and the principal on the foods they would like to see on the lunch menu daily.

Alignment

Standard/Indicator Addressed

Math (2.MDA.9): Collect, organize, and represent data with up to four categories using picture graphs and bar graphs with a single-unit scale.

Social Studies (2-3.2): Explain how people's choices about what to buy will determine what goods and services are produced.

ELA (Fundamentals of Communication) 1.4: Participate in shared conversations with varied partners about focused grade level topics and texts in small and large groups.
ELA (Fundamentals of Communication) 1.5: Explain personal ideas and build on the ideas of others by responding and relating to comments made in multiple exchanges.
ELA (Fundamentals of Communication) 3.2: Create a simple presentation using audio, visual, and/or multimedia tools to support communication and clarify ideas, thoughts, and feelings.

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
   b. Recognize there may be multiple entry points to a problem and more than one path to a solution.

4. Connect mathematical ideas and real world situations through modeling.
   a. Identify relevant quantities and develop a model to describe their relationships.
   b. Interpret mathematical models in the context of the situation.

6. Communicate mathematically and approach mathematical situations with precision.
   c. Use appropriate and precise mathematical language.
   d. Use appropriate units, scales, and labels.

Science and Engineering Practices

2.S.1A.5: Use mathematical and computational thinking to (1) express quantitative observations using appropriate English or metric units, (2) collect and analyze data, or (3) understand patterns, trends and relationships.

2.S.1A.8: Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions about the natural world, (2) understand phenomena, (3) develop models, or (4) support explanations. Communicate observations and explanations using oral and written language.

ELA Inquiry Standards

4.2 Use appropriate tools to communicate findings and/or take informed action.
4.3 Reflect on findings and pose new questions for further inquiry.

Connections

Disciplinary Literacy Strategies (for Purposeful Reading, Meaningful Writing, and Productive Dialogue)

I Think, We Think
Bounce cards
RAFT

Computational Thinking

Computational thinking (CT) is a problem-solving process that includes (but is not limited to) the following **characteristics***:*

- Formulating problems in a way that enables us to use a computer and other tools to help solve them.
- Logically organizing and analyzing data
- Representing data through abstractions such as models and simulations
- Automating solutions through algorithmic thinking (a series of ordered steps)
- Identifying, analyzing, and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources
- Generalizing and transferring this problem solving process to a wide variety of problems

These skills are supported and enhanced by a number of dispositions or attitudes that are essential dimensions of CT. These **dispositions or attitudes** *include:*

- Confidence in dealing with complexity

- Persistence in working with difficult problems
- Tolerance for ambiguity
- The ability to deal with open ended problems
- The ability to communicate and work with others to achieve a common goal or solution

Content Area (2 or more) Connections

This lesson connects 2nd grade standards in **math, social studies** and **ELA**. In math, students will collect, organize and represent data on their class' favorite lunch choices using bar graphs and picture graphs. The social studies concept of explaining how people's purchasing choices determine what goods and services are produced is addressed as students explore how their lunch preferences impact decisions the cafeteria manager has to make. In ELA, students use the data as support for a persuasive letter to the cafeteria manager and the principal requesting the food options students would like to see on the lunch menu daily.

Lesson Plan

Time Required – (Three 60 Minute Class Periods)

Disciplinary Vocabulary – bar graph, picture graph, data, title, labels, collect, organize, represent, horizontal scale

Materials Needed

- o Grid paper

Formative Assessment Strategies: Student writing and dialogue, teacher observation and questioning

Computational Thinking: This lesson addresses computational thinking through:

- Formulating problems in a way that enables us to use a computer and other tools to solve them through the use of a graphing software to create bar graphs such as: https://nces.ed.gov/nceskids/graphing/classic/bar_pie_chart.asp?temp=5173908
- Logically organizing and analyzing data through t-charts and bar graphs
- The ability to communicate and work with others to achieve a common goal or solution

Misconceptions: Watch for students who may confuse axis labels.

Engage

- Teacher asks, how might we find out our class' favorite school lunch food from these choices – corn dogs, chicken nuggets, pizza, and veggie wraps?

- Use *I Think, We Think* strategy.
  http://www.s2temsc.org/uploads/1/8/8/7/18873120/i_think_we_think_strategy.pdf
- Allow students to talk about how they would collect the data.
- Record their ideas on the board
- Decide as a group an idea you would like to try.

Explore

- Create a human bar graph.
  - Teacher writes the lunch choices on the horizontal scale across the board.
  - Have students line up in front of the board in front of their favorite lunch food
  - Ask the students questions such as which line has the most students? The least? How many chose pizza? Corn dogs? etc.
  - In each line, have the students closest to the board count the number of students in their line and write that number on the board under their food choice.
- Students return to their seats.

Explain

- Tell students that they just created a human bar graph, but data may be collected in various ways such as in a t-chart. Have students use a t-chart to organize the data. Note: drawing conclusions from t-charts are a component of 2.MDA.10.

Our Class' Favorite Lunch Foods

Food	Number of Votes
Corn Dogs	
Chicken Nuggets	
Pizza	
Veggie Wrap	

- Model for students how to graph the data in a bar graph and a picture graph.
- Facilitate dialogue using Bounce Cards - http://www.s2temsc.org/uploads/1/8/8/7/18873120/bounce_cards_strategy.pdf : How might the cafeteria manager use the information from our graphs when planning menus, purchasing and preparing food? (Social Studies 2-3.2)
- Have students write a letter using RAFT *http://www.s2temsc.org/uploads/1/8/8/7/18873120/raft_strategy.pdf :
  - Write a letter to the cafeteria manager and the principal to convince them to add the favorite lunch food from our class as one of the menu options every day.

- o Add the bar graph to your letter. Optional: Create using graphing software such as https://nces.ed.gov/nceskids/graphing/classic/bar_pie_chart.asp?temp=5173908
- • Assessment:
    - o Students complete t-chart by surveying classmates on beverage options: milk, orange juice, apple juice, water
    - o Create bar graph and picture graph

Other information on this indicator(s) can be found in the support documents/resources on the SC State Department website.

> *www.ed.sc.gov (Instruction → Standards and Learning → Mathematics or Science → Support Documents and Resources)*

Content Area (Disciplinary) Literacy strategies and descriptions can be found on the S2TEM Centers SC website:

> *s2temsc.org (Resources → Disciplinary Literacy Virtual Library → Strategy Warehouse)*

Computational Thinking Reference:

> *https://csta.acm.org/Curriculum/sub/CurrFiles/CompThinkingFlyer.pdf*
> *https://csta.acm.org/Curriculum/sub/CompThinking.html*

Additional Information

Level 1 lessons contain a realignment to the 2014 Science and/or the 2015 Mathematics Standards.

Level 2 lessons contain Level 1 information and Content Area Literacy and Disciplinary Literacy Strategies.

Level 3 lessons contain Level 1 and 2 information and Computational Thinking Connections.

Level 4 lessons contain Level 1, 2, and 3 and integration of at least 2 content areas.