SD 38 K-12 Mathematics & Numeracy
Grade 9: week two plan

Rationale:
"Life in the 21st century is defined by data, tracking everything from our shopping and exercise habits to the spread of disease, and the impact of climate change (Spector, 2020)." *Data Science* (an expression on what is happening in the real world) is taking more prominence in curricula across the world, because it provides a means for students to see how mathematical ideas connect to their daily lives and what consequences these ideas can have (Levitt, 2020).

"We urgently need to teach kids what they are going to actually use in their lives and their work (Boaler, 2020)."

Big Idea: Analyzing the validity, reliability, and representation of data enables us to compare and interpret data.

Curricular Content: Data Science
- Interpreting and comparing graphs
- Synthesizing information from various forms of text
- Using data to understand social issues
- Conducting a survey

Curricular Competencies:
- Visualize to explore mathematical concepts
- Apply multiple strategies to analyze infographics and data/data representation for pertinent information, influencing factors, make sense of a contemporary social issue

Core Competencies focus:
- Creative and critical thinking
- Communication

Key Mathematical Terms:
- data
- graph
- vertical axis
- horizonal axis
- table of values
- legend
- scale
- influencing factors (bias, use of language, ethics, cost, cultural sensitivity, privacy)
- scatter plot graph
- correlation
- population
- sample
- survey
- misleading

The three parts of this learning plan, can be implemented separately, or through an extended period of time. Although students do not require access to an electronic device to interpret or represent graphs, they may be provided with the option of using electronic application as a tool to complete relevant tasks.

Part One: Visualization Activity

1. **Notice/Wonder** – Allows students to brainstorm ideas and explore contexts/problem before attempting to determine solutions, or deeper meanings. Would be beneficial to offer this strategy in an online discussion, although not necessary. Thinking prompts may assist with differentiation.

As you look at the graphs one at a time, list what you **notice**?

Thinking prompts

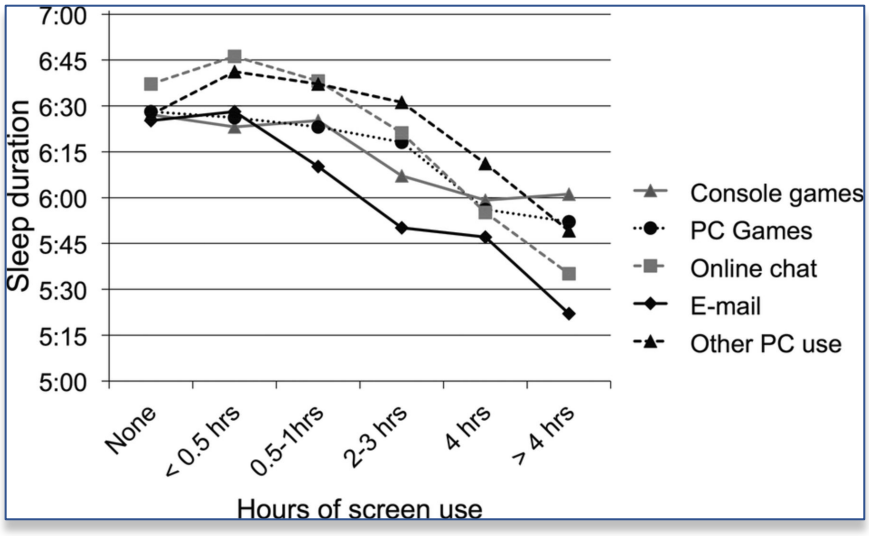
- something you **see** (what does the x-axis represent? What does the y-axis represent? What might the topic of graph be?
- What features of the graphs are you using to makes sense of it?
- When does the data begin and end on each axes?

As you look at the graph, what do you **wonder**?

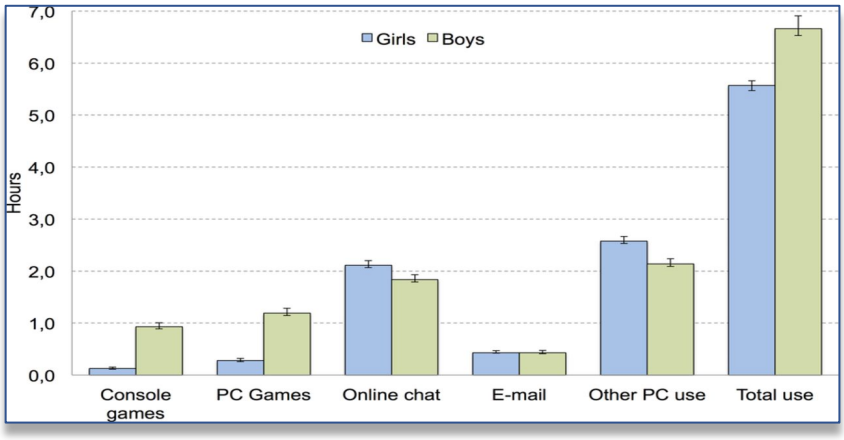
Thinking prompts

- What are you curious about?
- How do the axes relate to one another?
- Are the graphs linked?
- What might the graphs suggest (tell us)?

Graph 1



Graph 2

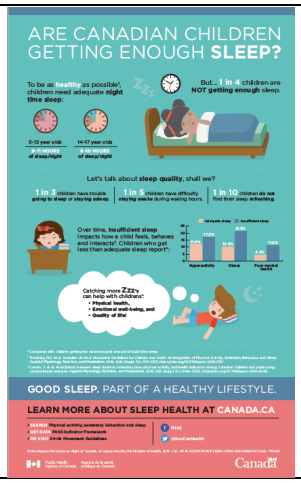
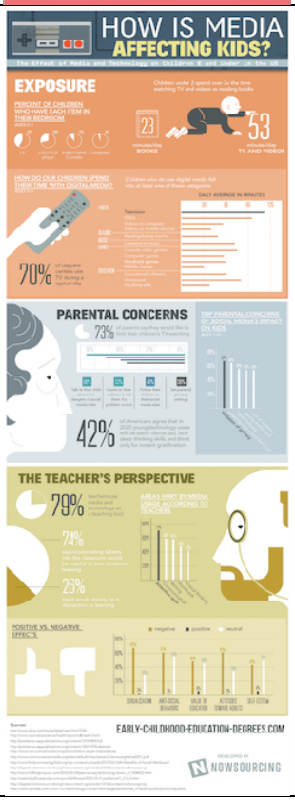


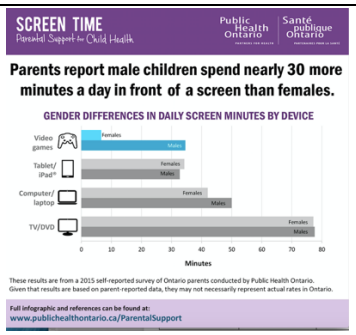
2. Using your responses to the following questions, explain what further insights you had.

- What patterns do you see?
- What important information might be missing from this display of the graphs?
- What conclusions do the graphs direct you toward (or suggest)?
- What more do you want to know?
- What do you think the author's purpose was in constructing this graph?

Part Two: Connection Activity

3. Examine the three infographics provided, and summarize the main ideas of each in the table below. Note – infographics are in the INFOGRAPHICS document folder on the SD38 portal or can be found online.

Infographic	Author	Main Ideas	Message/Intent
			
			

Represent how the information provided in these infographics connects to that of the graphs you explored earlier. For example, you might use a Venn Diagram to illustrate the similarities and differences between them.

Part Three: Interdisciplinary Task

Areas of Learning

- Mathematics
- Science
- English Language Arts

Curricular Competencies

Mathematics 9	Science 9	English Language Arts 9
Analyzing the validity, reliability, and representation of data enables us to compare and interpret data. Use reasoning and logic to explore, analyze, and apply mathematical ideas Use mathematical arguments to support personal choices	Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative) Construct, analyze and interpret graphs (including interpolation and extrapolation) Use knowledge of scientific concepts to draw conclusions that are consistent with evidence Demonstrate an awareness of assumptions, question information given, and identify bias in their own work and secondary sources	Questioning what we hear, read, and view contributes to our ability to be educated and engaged citizens. Think critically, creatively, and reflectively to explore ideas within, between, and beyond texts Synthesize ideas from a variety of sources to build understanding

Essential Understandings

We collect and use data to help us answer questions and make decisions.
Learning Activity – Is sleep affected by use of social media?

Using the principles of the Scientific Method, conduct a class study that explores if there is a relationship between the average number of hours an adolescent spends using social media per day, and the average number of hours spent sleeping per day.

1. Write a study (research) question.
2. Write a hypothesis keeping in mind the ideas represented in the graphs and infographics used in above .
3. Describe the population and sample.
4. Conduct a survey in your class (collect and record data).
5. Plot data on a scatter plot graph.
6. Analyze the graph for trends (correlation).
7. Draw a conclusion based on based on the hypothesis stated and the results obtained.
8. Discuss factors that could have influenced your results.

Resource (for further reading)

https://ed.stanford.edu/news/bringing-math-class-data-age

Related Numeracy Task

Resource:
Peter Liljedahl's Numeracy Tasks
http://www.peterliljedahl.com/teachers/numeracy-tasks

RACE AROUND THE WORLD

You have just entered a race around the world. The rules of the race are very simple:

- you must start and finish in Vancouver.
- you must visit one major city (marked) on each continent except Antarctica.
- Vancouver does not count as your North American city.
- Your airline ticket only allows you to travel east.

Your goal is to get back to Vancouver in the shortest amount of time.

To help you calculate your time please keep these simple rules in mind:

- flight paths can be seen as straight lines between cities.
- 1 cm of travel on the map takes an airplane 2 hours to fly.
- airplanes depart each city on every even hour **local time**. That is, they leave at 2:00, 4:00, 6:00, ...
- the dotted vertical lines on the map are time zones. Every time you cross one of these lines while travelling east you should advance your clock by one hour.

Good luck – and may the best team win.