EDCI 405 Mini Lesson - Data Collection and Analysis (Grade 6)

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Description

This is a lesson for Grade 6 that will cover topics that underlie data collection and analysis. This lesson would be the 2nd of a number of lessons that look at data collection and different ways data is analyzed. In this lesson students will be introduced to the mean and median and how to find them. Student's will be asked to collect a primary data set. Students will be asked to look at secondary data sets. Students will also be able to create and interpret stem and leaf plots, as well as use an online database to find data.

Summary of Objectives

Big Idea: Data from the results of an experiment can be used to predict the theoretical probability of an event and to compare and interpret.

Curricular Competencies

- Connect mathematical concepts to each other and to other areas and personal interests
- Communicate mathematical thinking in many ways
- Represent mathematical ideas in concrete, pictorial, and symbolic forms
- Use reasoning and logic to explore, analyze, and apply mathematical ideas

Curricular Content

- Graphs: table of values, data set; creating and interpreting a ... graph from a given set of data
- Estimate reasonably
- Single-outcome probability, both theoretical and experimental
- Graphing data on First Peoples language loss, effects of language intervention

Cross Curricular Connections

Science:

In the Grade 6 science curricular content one of the subheadings is "Processing and analyzing data and information"

- Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data
- Identify patterns and connections in data
- Compare data with predictions and develop explanations for results

Data collection and analysis is a key element of the scientific process

First People's Principles of Learning

- Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors
- Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).
- Learning involves recognizing the consequences of one's actions

List of materials

- Paper/notebook

- Pencil or pen
- Worksheet (provided)
- Chromebooks (or some equipment with internet access)

Terms

Reviewed	Introduced
- Data - Data set - Averages - Graphs - Stem and leaf plots - Inference	- Maximum - Minimum - Mean - Median - Primary data source - Secondary data source

Timeline

This would be either done in these would be done in two 40 minute classes. The first one would cover primary source data collection and averages. The second class would cover secondary source data and analysis of these data sets.

Activity 1

Script

Hello Class!

For this first data collection and analysis activity we are going to collect a data set and then analyze it using averages. First I am going to collect my data *data collecting montage*.

So I now have collected my data, can you guess what method of data collection I used to collect this data set? …. If you guessed observing and recording (or counting a sample) you would be correct! Which, as we know from our previous classes on methods of data collection is a form of primary data collection. Primary data being any data that is collected by first hand experience.

Show data now that I have my data we are going to analyze it by finding difference averages. These averages are called the mean and median.

Averages are a simplified representation of a data set, which can represent the central value or most common value of a data set.

This value allows us to predict a likely amount for a similar set of data. The term average also implies the number is a generalization and that there are always values above and below the “average”.

The “mean” is the most commonly used average. It is the number that we find when we add up all the values of our data set and then divide them by the total number of values that make up the data set.

The “median, is the number that is in the very middle of our data set. This requires that we find our minimum value (or lowest value) and our maximum (our highest value). The value that is equi-distance from our maximum and minimum values is our “median”.

To practice this you can either find your own data set around the house. Some ideas for inspiration could be counting up numbers of different shapes you find in your house, how many of each type of utensil you have, or how many minutes you spend during your day doing specific tasks.

Some pre-collected data sets that you can use:

In past two weeks, litres/day of water drank (L):
2,4,3,2,1,3,4,2,2,3,1,4,½,2,3

Minutes spent talking on the phone per day in the last 2 weeks (minutes):
5, 0, 45, 78, 3, 25, 33, 100, 86, 140, 79, 102, 77, 65, 110, 132, 81, 89, 44, 103, 65

Daily temperature history at the Victoria Int'l Airport on March 30:

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Temp (ºC)	7.5	7.6	9.9	11.5	10.6	6.6	9.4	9.6	4.5	6.4	7.0,	9.9	5.8	9.8

Questions

- Why are averages useful?
- What scenarios have you used averages or think using averages would be useful to you?
- In what situation would the mean be more useful? What about the median?
- What are some real life examples of data collection and analysis using averages in the world today?

Activity 2

Introduce Activity 2 by recalling students' knowledge of stem and leaf plots. Discuss what it means to make an inference, and how data are able to help us do that.
Distribute worksheet (attached) to each student, then have them break into pairs or small groups to complete.
Students are first presented with a stem and leaf plot displaying the average low temperature in capital cities of each of Canada's provinces and territories. Students are asked to interpret and analyse the table using three questions provided on the worksheet.
Students are then given data for average temperatures in each of the world's most populous cities and asked to create their own stem and leaf plot to represent that data.

To complete the next part of the activity, each student group is provided with a chromebook.

Students are to use the link and instructions on the worksheet to navigate to Statistics Canada's Census Program Data Viewer, to find data representing the percentage of the population with a mother tongue other than English.
Since the website on first glance is quite dense with information, some time should be spent going over how to navigate and interpret it with the whole class. If a digital projector is available, show the website to the class and talk them through it, give them a chance to ask questions.
It is also useful to talk them through the meaning of "mother tongue," and to think of some real world examples of individuals in the community who might fit this category.
Once students seem able to get around the website they can work through the questions provided on the worksheet.

At the end of the activity the worksheet should be collected for formative assessment purposes. Students will be assessed on their comprehension of the concepts by the clarity of their answers. Descriptive feedback can be included on the worksheets and returned to students.

Differentiation

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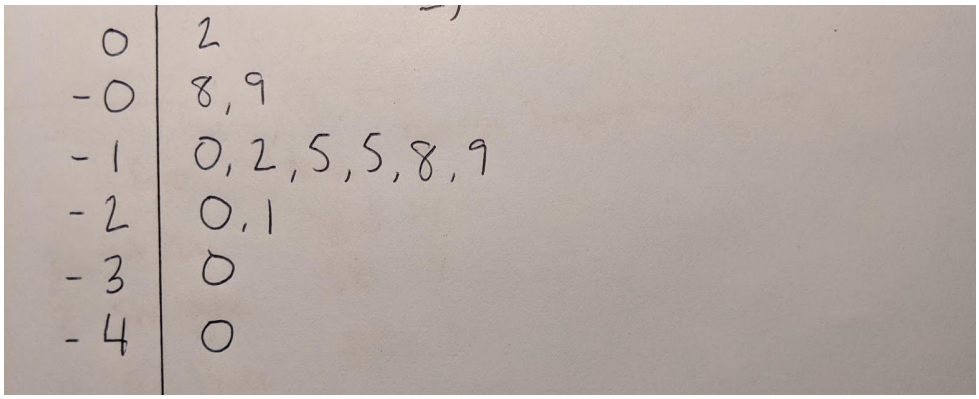
- For advanced students (compare & find averages between results) find a second data source and graph, introduce a third type of graph
- Students who have difficulty navigating the statistics Canada website can try viewing some data here (it is designed for use by elementary students) https://censusatschool.ca/
- Students who are proficient, working ahead of others, are encouraged to navigate beyond the prescribed Statistics Canada data set to see what other data the census provides.

Assessment

- Students will be asked to find the mean and median for different data sets.
- Students may also participate in a data collection activity to demonstrate their understanding of the process of data collection
- Students will have the opportunity to share their findings with the class
- Students will self assess their understanding of the concepts by completing the activities and answering the questions provided after the lesson.
- Each student will be provided a worksheet for completion in small groups. Worksheets will be collected to check that learning outcomes were met, and returned to students with descriptive feedback on their progress.

Data Collection and Analysis Worksheet

Average January Temperature Low in Canadian Capital Cities (Rounded to the nearest 1)



What is the lowest average temperature recorded? The highest?

How many cities recorded average temperatures lower than 20 degrees C?

What temperature was recorded the most number of times?

Next we can see the average January temperatures for the 10 most populous cities in the world:

1. Tokyo - 5
2. Delhi - 14

3. Shanghai - 5
4. Sao Paolo - 22
5. Mexico City - 15
6. Cairo - 14
7. Dhaka - 19
8. Mumbai - 24
9. Beijing - -3
10. Osaka - 6

Now, see you if you can create your own stem and leaf plot to represent that data!

For the next part of this activity, use the following link to view Statistics Canada's Census Program Data Viewer:

https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dv-vd/cpdv-vdpr/index-eng.cfm

Click on: **I Want to** ---> **Select an Indicator** ---> **Language** ---> **Percentage of Population with a Mother Tongue other than English**

Once you've had a chance to view the data, answer the following questions.

1. What province/territory has the highest percent of language speakers whose mother tongue is not English or French, the lowest?

2. Find your home province, what percentage of people there have a mother tongue other than English or French?

3. Is there a province or territory where more than half of language speakers have a mother tongue other than English or French? More than a quarter?