Student Handout for Science Literacy Week

Name: _____

Part 1

1. How could each community positively or negatively affect the water of Sharbot lake?

    - How might the economic activity of the village affect the health of Sharbot lake?
    - How might the presence of cottages around the lake affect the health of Sharbot lake?
    - How can the Provincial Park staff protect Sharbot lake?
    - How do you think uranium mines might have affected the health of Sharbot lake?

2. What are some things you notice about the graph on the other side of the page?

3. What's something you're wondering about the data you see?

4. What do you think the data may look like in 5 years? Why?

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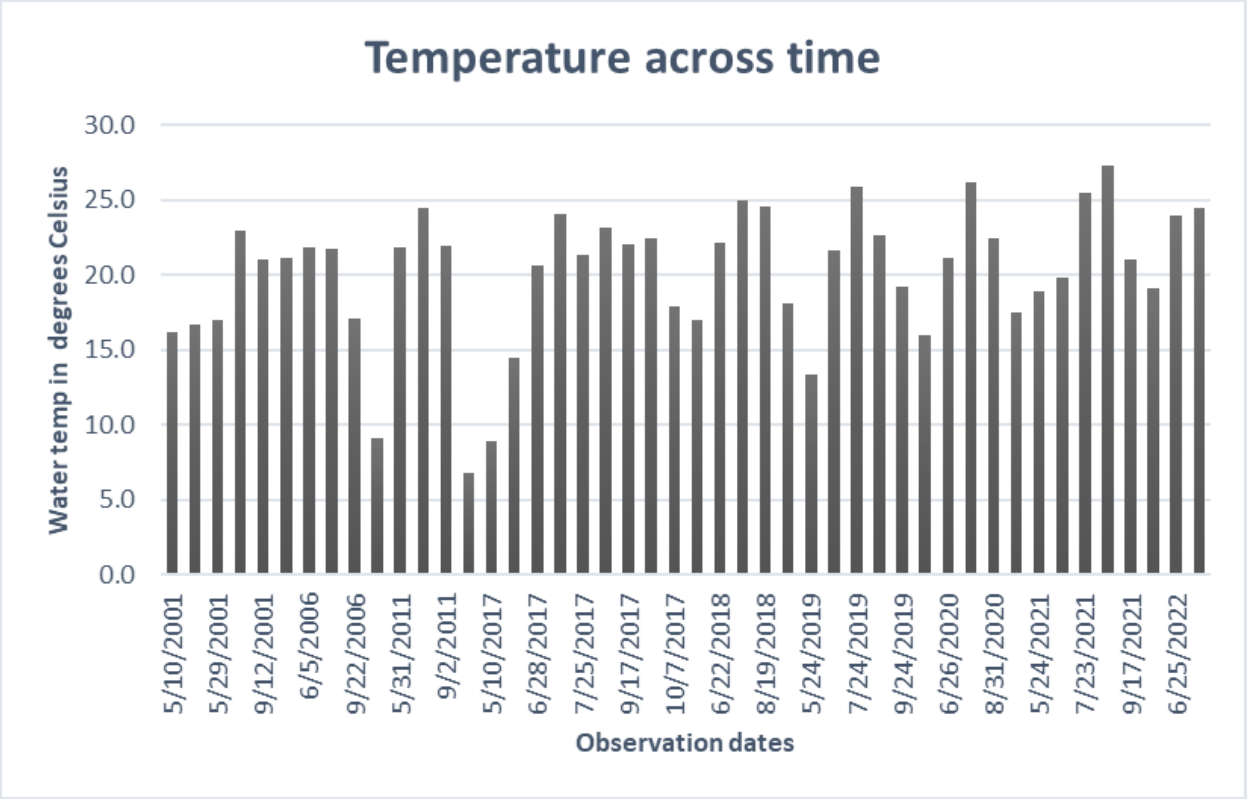

Extension activity:

1. Looking at the graph, do you notice any trends (i.e., change over time) in the data?

2. What factors may have affected the temperature of Sharbot Lake since 2001?

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Part 2

Grades 4-6: Looking at the tables on the other side of the page, calculate the following measures. (To simplify calculations, you can round table values to the nearest whole number.)

1. (GROUP 1) Calculate the MEAN of the data from 2001 to 2011.

2. (GROUP 2) Calculate the MEAN of the data from 2017 to 2018.

3. (GROUP 3) Calculate the MEAN of the data from 2019 to 2022.

Grades 6-8: Looking at the tables on the other side of the page, calculate the following measures.

1. (GROUP 1) Calculate the RANGE of the data from 2001 to 2011.

2. (GROUP 2) Calculate the RANGE of the data from 2017 to 2018.

3. (GROUP 3) Calculate the RANGE of the data from 2019 to 2022.

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Extension activity:

1. Do you notice any outliers (data points that are very different from the others) in the tables? What may have caused them?

2. How would the mean change if we removed these outliers?

3. How would the range change if we removed these outliers?

Table 1: Water temperature 2001-2011

Observation date	Water temp.
5/10/2001	16.2
5/17/2001	16.7
5/29/2001	17.0
8/22/2001	22.9
9/12/2001	21.0
6/1/2006	21.1
6/5/2006	21.8
8/25/2006	21.7
9/22/2006	17.1
10/27/2006	9.1
5/31/2011	21.8
8/4/2011	24.5
9/2/2011	21.9

Table 2: Water temperature 2017-2018

Observation date	Water temp.
4/28/2017	6.8
5/10/2017	8.9
5/22/2017	14.5
6/28/2017	20.6
7/19/2017	24.1
7/25/2017	21.3
8/17/2017	23.2
9/17/2017	22.0
9/20/2017	22.4
10/7/2017	17.9
5/23/2018	17.0
6/22/2018	22.1
7/27/2018	25.0
8/19/2018	24.6
9/27/2018	18.1

Table 3: Water temperature 2019-2022

Observation date	Water temp.
5/24/2019	13.3
6/24/2019	21.6
7/24/2019	25.9
8/25/2019	22.6
9/24/2019	19.2
5/24/2020	16.0
6/26/2020	21.1
7/26/2020	26.2
8/31/2020	22.4
9/26/2020	17.5
5/24/2021	18.9
6/27/2021	19.8
7/23/2021	25.5
8/20/2021	27.3
9/17/2021	21.0
5/29/2022	19.1
6/25/2022	24.0
7/31/2022	24.5

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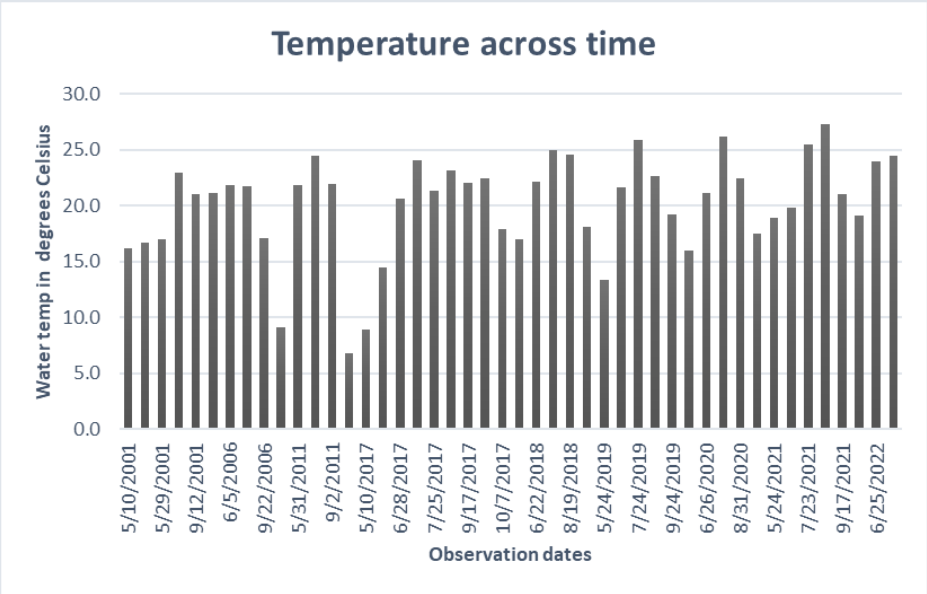
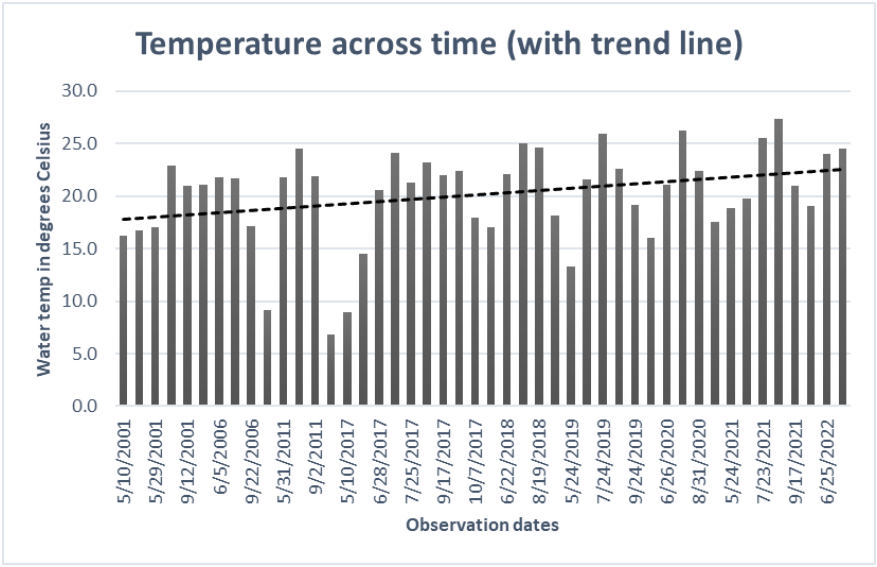
Part 3

1. What do you see changing over time in the graph below?



2. What do you think the line is showing in the graph below?



3. What can you see happening at Sharbot lake from 2001 to 2022?

4. What do you think the consequences of this might be?

Extension activity:

1. What can we learn from the trend line in the graph above that we couldn't learn from the bars?

2. Given the trend line above, what water temperature would you expect to observe in 1995? In 2030?

3. How do you think outliers affect the trend line?

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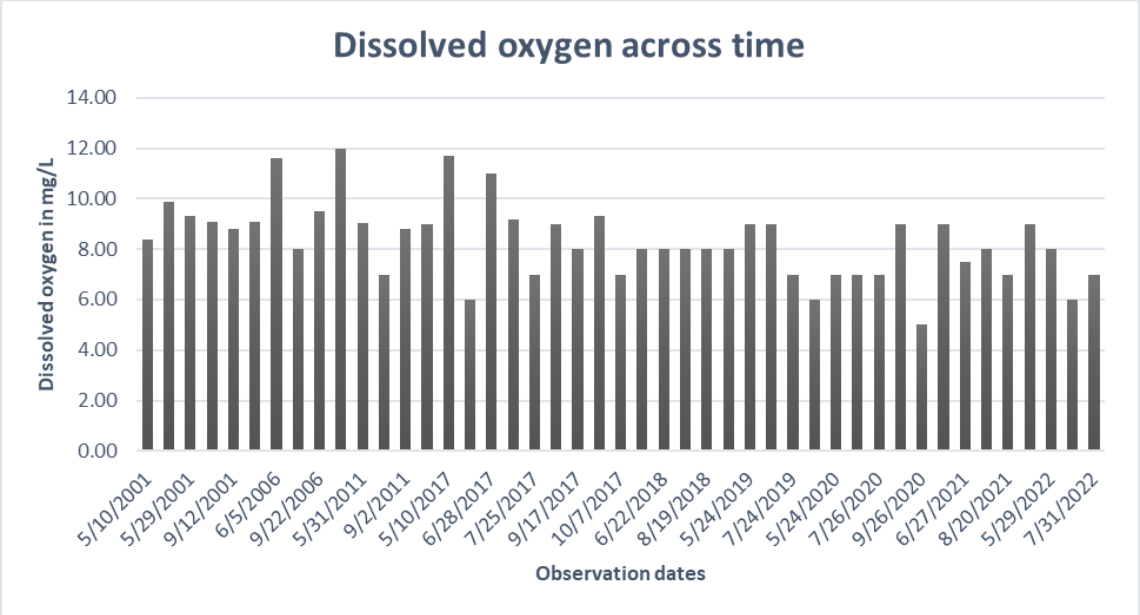
Part 4

1. In the graph below, when is the lowest recorded dissolved oxygen reading? When is the highest?

2. What do you think will happen by the 2030's? What is the lowest value that dissolved oxygen might reach? What might the consequences of this be for aquatic life?



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1. In the graph on the other side of the page, how are water temperature and dissolved oxygen changing over time? Why do you think that might be?

2. What does the graph suggest about the relationship between water temperature and dissolved oxygen? Do you think one may influence the other?

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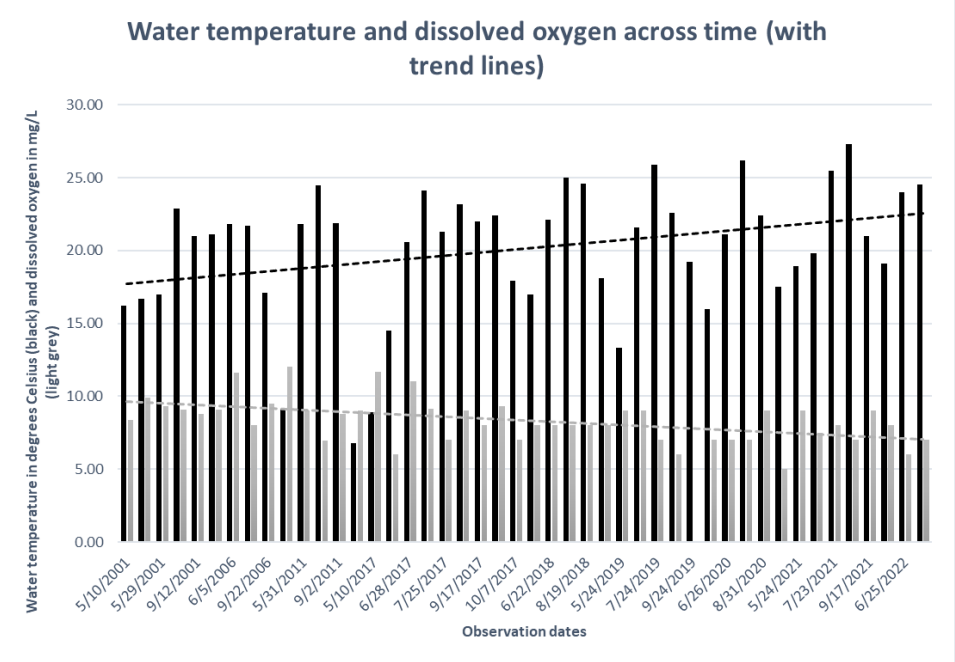
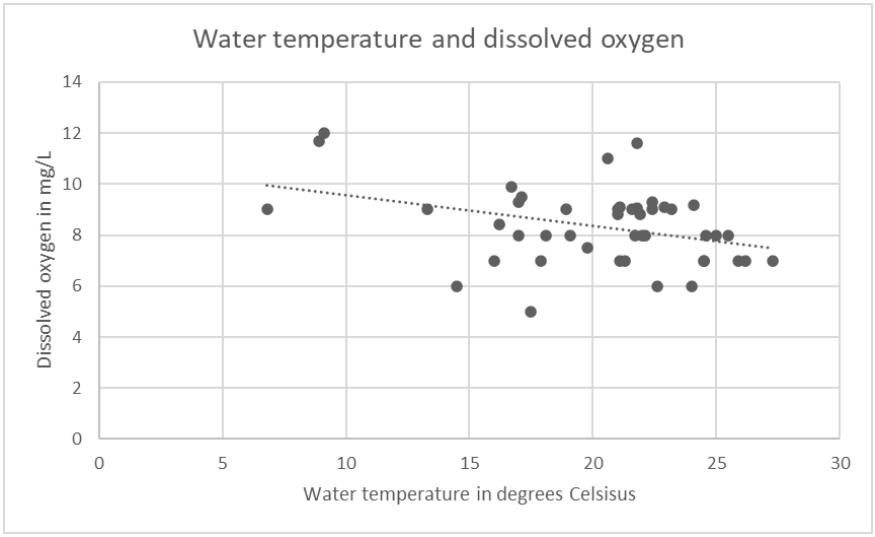


Extension activity:



1. Based on the scatterplot, what is the highest value recorded for dissolved oxygen? What was the water temperature for this observation?
2. What is the highest value recorded for water temperature? What was the value of dissolved oxygen for this observation?
3. Based on the trend line (line of best fit), what dissolved oxygen value would you expect for a water temperature of 30 degrees celsius?
4. Based on the trend line (line of best fit), what water temperature would you expect for a dissolved oxygen value of 10 mg/L?
5. What kind of relationship might exist between water temperature and dissolved oxygen?

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Part 5

1. Using the table below, make a bar graph using graph paper and a ruler.You need to choose what will go on the x and y axis, and to plot each bar correctly. Remember to label your x and y axis, and include a title.To make it easier, you can round table values to the nearest whole number.

Table 1: Water temperature - East basin - 2020-2022

Observation date	Water temperature
9/26/2020	17.4
4/25/2021	8.6
5/24/2021	19.9
6/27/2021	20.9
7/23/2021	25.8
8/20/2021	27.2
9/17/2021	20.7
4/24/2022	7.3
6/24/2022	24
7/30/2022	24.5

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Extension activity: Using the table of temperatures below, make a **histogram** of water temperature at Sharbot Lake (West basin) from 2019 to 2022. This means you need to set an appropriate number of intervals, make a frequency distribution table using these intervals, then make a graph with the intervals on the x axis and frequency on the y axis. Don't forget to label your axes!

Table 2: Water temperature 2019-2022

Observation date	Water temperature
5/24/2019	13.3
6/24/2019	21.6
7/24/2019	25.9
8/25/2019	22.6
9/24/2019	19.2
5/24/2020	16.0
6/26/2020	21.1
7/26/2020	26.2
8/31/2020	22.4
9/26/2020	17.5
5/24/2021	18.9
6/27/2021	19.8
7/23/2021	25.5
8/20/2021	27.3
9/17/2021	21.0
5/29/2022	19.1
6/25/2022	24.0
7/31/2022	24.5

To give you an example, here is a histogram made with observations of **dissolved oxygen**:

Table 3: Frequency distribution table - Dissolved oxygen 2001-2022

4-5.99	1
6-7.99	13
8-9.99	27
10-11.99	3
12-13.99	1