

Overarching Question: What important lessons can we learn from math that can help us live mino bimaadiziwin?

Overarching Challenge: Use Indigenous knowledge and western mathematics to develop a guide that includes helpful advice for living mino bimaadiziwin. (For example, communicate five important math tips or lessons in the format of your choice.)

Lesson Question: Which best describes the trend in the data: a line of best fit or a curve of best fit?

Lesson Challenge: Describe whether the trend in the data is best represented by a line or a curve and check the reasonableness of your initial prediction.

Lesson Summary: In this lesson, you will consider different patterns in the data that describes the relationship between fish and seafood consumption and the year. You will make the most accurate prediction about fish and seafood consumption in the year 2030.

Big Idea: To make the most accurate predictions, you must consider a range of patterns.

Lesson Grouping: These lessons are best completed in the following order:

1. Which graph best describes the trend in fish and seafood consumption over time?
2. Which best describes the trend in the data: a line of best fit or a curve of best fit?
3. How well does an equation match a line of best fit, a table, and a description in words?

Lesson Question: Which best describes the trend in the data: a line of best fit or a curve of best fit?

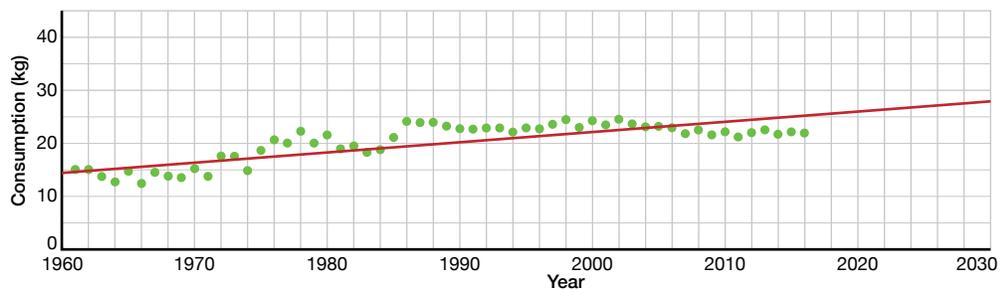
Lesson Challenge: Describe whether the trend in the data is best represented by a line or a curve and check the reasonableness of your initial prediction.

Start Your Thinking

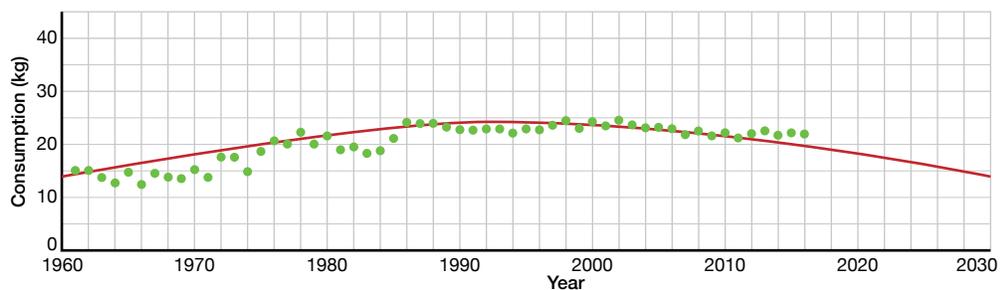
Suppose you are an environmentalist analyzing the historical data for fish and seafood consumption in Canada. In the previous lesson, you looked at data from 1965 to 1980. You now have data starting in 1961 and ending in 2017. With more data available, you will make another prediction for the fish and seafood consumption in 2030.

You now have graphs that show either a line or a curve of best fit. Review the four graphs below. Which graph best describes the trend in the data and allows you to make the most reasonable prediction about fish and seafood consumption in 2030? Use the arrow on the next page to rank the lines or curves of best fit from strongest to weakest and to help you make a reasonable prediction.

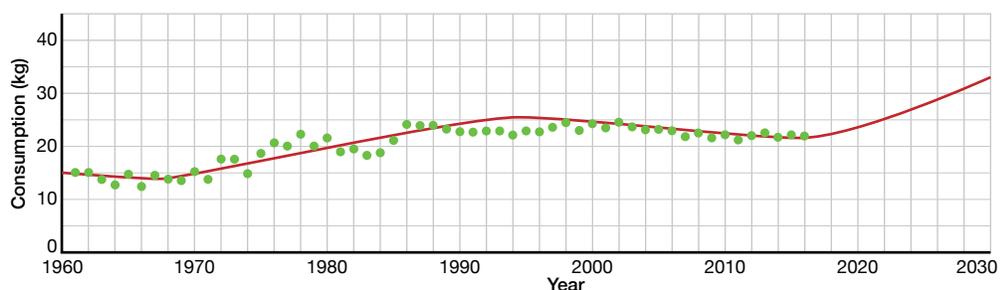
A. Canadian Fish and Seafood Consumption (kg) Over Time



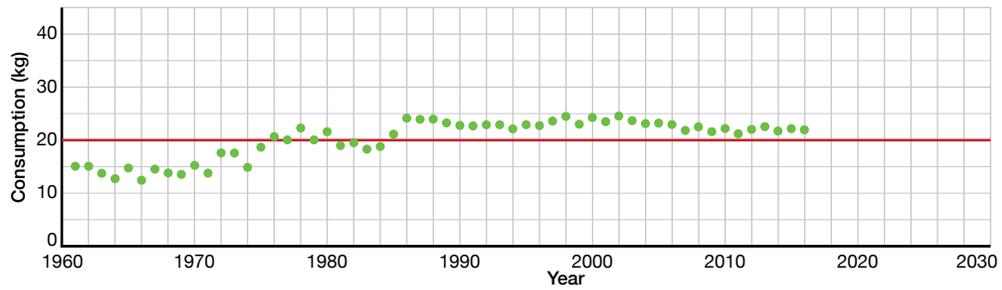
B. Canadian Fish and Seafood Consumption (kg) Over Time



C. Canadian Fish and Seafood Consumption (kg) Over Time



D. Canadian Fish and Seafood Consumption (kg) Over Time



Rank the lines or curves of best fit from weakest to strongest by placing their letters in the boxes along the arrow.

←

←
→

Weakest **Strongest**

The graph that best describes the trend in the data is

- a line (linear)
- a curve (nonlinear)

Now, using the strongest line or curve of best fit, what is your prediction?

The most likely fish and seafood consumption in Canada in 2030 is

- 26–29 kg
- 16–19 kg
- 33–35 kg
- 20 kg

because...

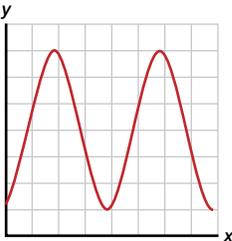
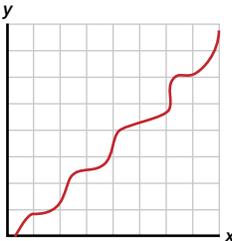
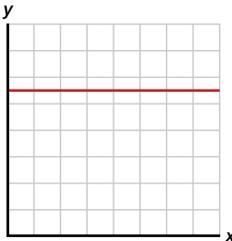
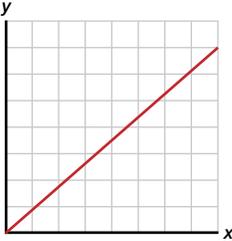
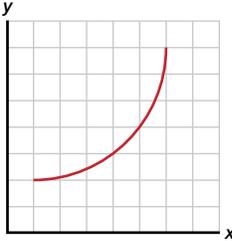
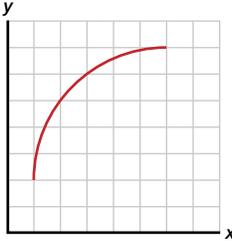
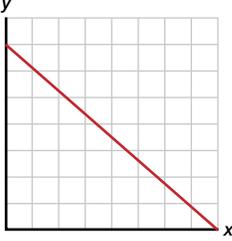
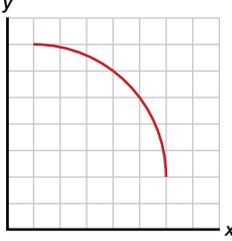
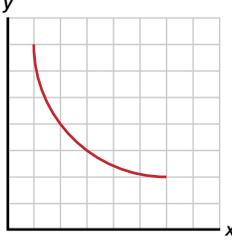
Does this prediction seem realistic? Do you think this is an example of using the gifts from Mother Earth respectfully?



Think About the Lesson Challenge

In this lesson, you will describe the trend in the data and use it to make the most accurate prediction for fish and seafood consumption in the year 2030.

Before moving on to the next part of the lesson, let's pause and think about what sets of words you can use to describe trends in graphs. Review the examples in the table below. Look at the trend in each graph and then the words used to describe it.

<p>Fluctuating (changing) <i>a lot</i></p> 	<p>Fluctuating (changing) <i>a little</i></p> 	<p>Not fluctuating (changing) <i>at all</i></p> 
<p>Increasing <i>by the same amount</i></p> 	<p>Increasing at an increasing rate (each year the consumption goes up by a larger amount)</p> 	<p>Increasing at a decreasing rate (each year the consumption goes up by a smaller amount)</p> 
<p>Decreasing <i>by the same amount</i></p> 	<p>Decreasing at an increasing rate (each year the consumption goes down by a larger amount)</p> 	<p>Decreasing at a decreasing rate (each year the consumption goes down by a smaller amount)</p> 

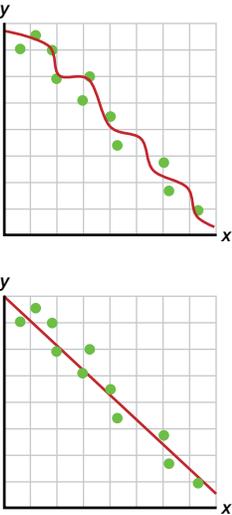


Look at the graph you chose on page 3 to best describe the trend in the data. Use the words above to describe the pattern this graph shows.

Fish and seafood consumption is _____ over time.

Grow Your Thinking

In the next part of the lesson, you will look at different sets of graphs and decide whether a line or a curve best describes the trend in the data. You will use the criteria from the previous lesson to help you choose the best line or curve of best fit.

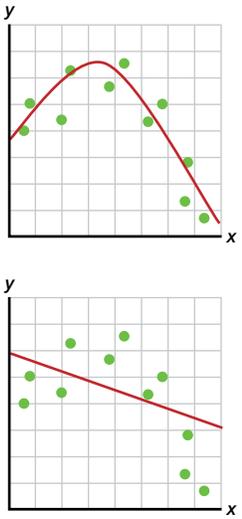
Graphs	Does it meet the criteria?	Can you make an accurate prediction?	Evidence
	<ul style="list-style-type: none"> <input type="checkbox"/> fits the trend in the data points as closely as possible <input type="checkbox"/> is balanced (equal number of points above and below the line/curve) <input type="checkbox"/> minimizes the distance between the line/curve and the points not on the line/curve <input type="checkbox"/> follows the overall trend in the data 	<p>Choose the best option:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The straight line of best fit allows me to make a (<i>perfect, great, not good, horrible</i>) prediction about the data. <p>OR</p> <ul style="list-style-type: none"> <input type="checkbox"/> The curve of best fit allows me to make a (<i>perfect, great, not good, horrible</i>) prediction about the data. 	

Conclusion:

A (*line, curve*) best describes the trend in this data.

Therefore, I can describe the change over time using the following words:
(use the words from page 4)



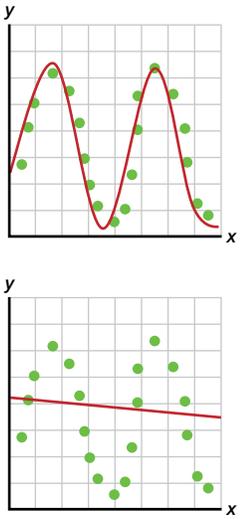
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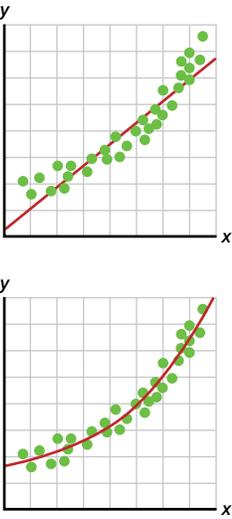
Graphs	Does it meet the criteria?	Can you make an accurate prediction?	Evidence
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Conclusion:

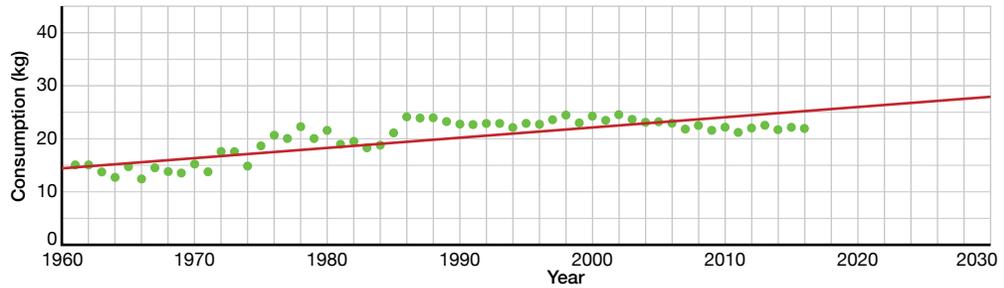
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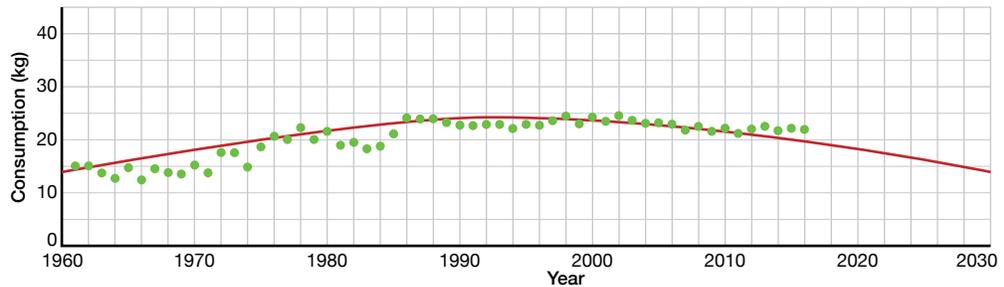
Pull Your Thinking Together

Now, look again at the graphs from the beginning of the lesson (shown below). Use the criteria to select the strongest line or curve of best fit and predict what the consumption will be for 2030.

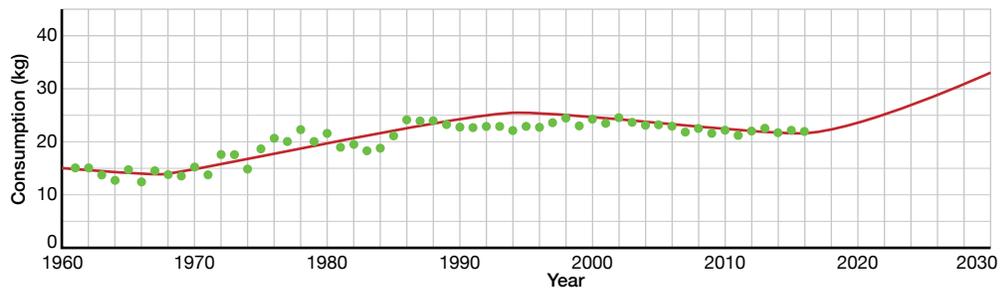
A. Canadian Fish and Seafood Consumption (kg) Over Time



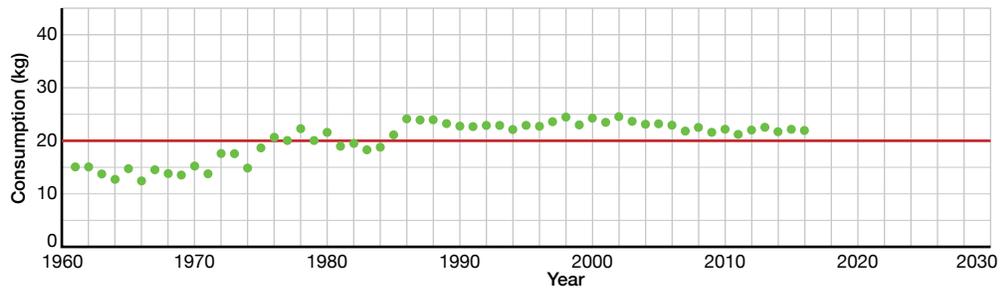
B. Canadian Fish and Seafood Consumption (kg) Over Time



C. Canadian Fish and Seafood Consumption (kg) Over Time



D. Canadian Fish and Seafood Consumption (kg) Over Time





Graph	Does it meet the criteria?	Evidence
A.	<ul style="list-style-type: none"> <input type="checkbox"/> fits the trend in the data points as closely as possible <input type="checkbox"/> is balanced (equal number of points above and below the line/curve) <input type="checkbox"/> minimizes the distance between the line/curve and the points not on the line/curve <input type="checkbox"/> follows the overall trend in the data 	
B.	<ul style="list-style-type: none"> <input type="checkbox"/> fits the trend in the data points as closely as possible <input type="checkbox"/> is balanced (equal number of points above and below the line/curve) <input type="checkbox"/> minimizes the distance between the line/curve and the points not on the line/curve <input type="checkbox"/> follows the overall trend in the data 	
C.	<ul style="list-style-type: none"> <input type="checkbox"/> fits the trend in the data points as closely as possible <input type="checkbox"/> is balanced (equal number of points above and below the line/curve) <input type="checkbox"/> minimizes the distance between the line/curve and the points not on the line/curve <input type="checkbox"/> follows the overall trend in the data 	
D.	<ul style="list-style-type: none"> <input type="checkbox"/> fits the trend in the data points as closely as possible <input type="checkbox"/> is balanced (equal number of points above and below the line/curve) <input type="checkbox"/> minimizes the distance between the line/curve and the points not on the line/curve <input type="checkbox"/> follows the overall trend in the data 	



Rank the lines or curves of best fit from weakest to strongest by placing their letters in the boxes along the arrow.



The graph that best describes the trend in the data is

- a line (linear)
- a curve (nonlinear)

Therefore, I can describe the change in fish consumption over time using the following words:

Fish and seafood consumption is _____ over time.



Now, using the strongest line or curve of best fit, what is your *final* prediction?

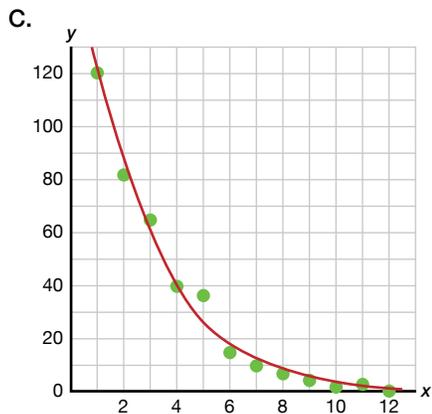
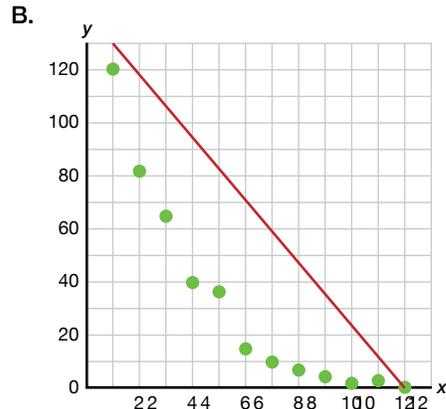
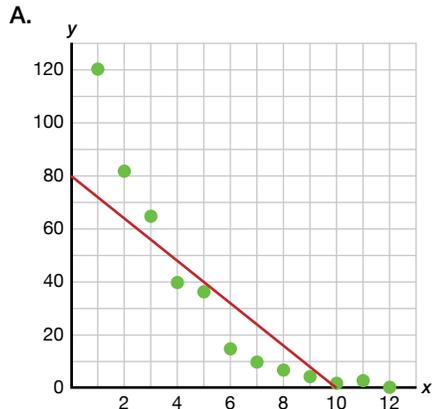
The most likely fish and seafood consumption in Canada in 2030 is

- 26–29 kg
- 16–19 kg
- 33–35 kg
- 20 kg

because...

Practise the Thinking

Practise what you have learned in this lesson by ranking the lines or curves of best fit from strongest to weakest, and describe the trend shown.



Graph	Does it meet the criteria?	Evidence
A.	<input type="checkbox"/> fits the trend in the data points as closely as possible <input type="checkbox"/> is balanced (equal number of points above and below the line/curve) <input type="checkbox"/> minimizes the distance between the line/curve and the points not on the line/curve <input type="checkbox"/> follows the overall trend in the data	



Graph	Does it meet the criteria?	Evidence
B.	<ul style="list-style-type: none"> <input type="checkbox"/> fits the trend in the data points as closely as possible <input type="checkbox"/> is balanced (equal number of points above and below the line/curve) <input type="checkbox"/> minimizes the distance between the line/curve and the points not on the line/curve <input type="checkbox"/> follows the overall trend in the data 	
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Rank the lines or curves of best fit from weakest to strongest by placing their letters in the boxes along the arrow.



The graph that best describes the trend in the data is

- a line (linear)
- a curve (nonlinear)

Therefore, I can describe the change over time using the following words:
(use the words from page 4)



Reflect on my Thinking

Think About the Lesson Challenge

In this lesson, you selected the strongest line or curve of best fit to help you make a reasonable prediction about fish and seafood consumption in Canada in 2030.



Did your thinking change from the initial prediction you made on page 3 to your final decision on page 11? Why?

How does your prediction compare to your final prediction at the end of the previous lesson? What may account for any differences?

Do you think this prediction is an example of using the gifts from Mother Earth respectfully?

Think About the Overarching Challenge

If you completed the launch lesson (“What lessons can we learn from math that can help us live *mino bimaadiziwin*?”), you probably started a Thoughtbook. In this Thoughtbook, you began thinking about ways to respond to the challenge: **Begin creating helpful advice for living *mino bimaadiziwin*.**

After you’ve finished the math lessons, you’ll use what you’ve learned to respond to that challenge. You can use the format of your choice—a song, a traditional art form, photographs, a poem, whatever you think would be best—to describe the actions we can take to live in a good way with the land.

Revisit your Thoughtbook now, and think about what you’ve learned in this lesson:

- What actions would you add to your Thoughtbook?
- Would you change any of the ideas that you already have in your Thoughtbook?

If you haven’t already started a Thoughtbook, you can answer these questions on page 16.

To complete this lesson, take a moment to reflect on your learning.



Success Criteria	How well am I doing?			
I can describe the trend in a graph in words.	1	2	3	4
I can accurately determine the strongest line or curve of best fit and use it to make predictions.	1	2	3	4

I'm still working on it

I've got it

Examples that support my rating:

My Thoughtbook: What lessons can we learn from math that can help us live mino bimaadiziwin?



Use words, symbols, or pictures to describe three pieces of helpful advice that we can learn from math that could help us live mino bimaadiziwin.