Lesson 2: Constructing Line Graphs

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| Learning Goals: |

* Learn the different parts of a line graph
* Learn how to construct a line graph from a predetermined scenario presented in a table form.

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| Topic: Construct line graphs |

Before learning how to construct a line/bar graph, let's define the various parts of a line graph.

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| **title** | The title of the line graph tells us what the graph is about. |
| **labels** | The horizontal label (x-axis) and the vertical label (y-axis), tells us what kinds of facts are listed. |
| **scales** | The horizontal scale and the vertical scale tell us how much or how many. |
| **points** | The points or dots on the graph show us the facts. |
| **lines** | The lines connecting the points give estimates of the values between the points. |

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| Example(s): |

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|  | The table below shows Dakota’s math scores in primary school (grades 3 through 6). Construct a line graph to visually display this data. |
| http://www.mathgoodies.com/lessons/graphs/images/tab.gif | |
|  | |  |  | | --- | --- | | **Jill's Secondary Math Scores** | | | **Grade Level** | **Math Score (%)** | | 3 | 82 | | 4 | 79 | | 5 | 70 | | 6 | 91 | |

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| Step 1: | **Find the range in values.** |
|  | There are two sets of values.  What units are used? **The units are grade level and math score (%)**  What is the greatest value and the least value for the first set?  **The grade level ranges from 3 to 6**  What is the greatest value and the least value for the second set? **The math score ranges from 70 to 95.** |

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| Step 2: | **Determine a Scale.** |
|  | Start with the horizontal scale. If you are using graph paper, let 1 unit on the graph paper equal 1 unit of the values you are graphing. Determine whether the greatest value will fit on the graph. If it doesn't, then change the scale so that each graph grid represents more than 1 unit and try again. Now repeat this process for the vertical scale.  For this example:  **The vertical scale must start at 0. So the vertical scale will range from 0 to 100. We will make each grid on the graph paper represent 10 units. Therefore the scale will be 10.** |
| Step 3: | **Label the graph.** |
|  | Mark each unit across the x-axis and along the y-axis. Label the marks by the units they represent. |

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| Step 4: | **Plot the points and connect them.** | |
|  | Plot a point for each pair of values. Which item of a pair is indicated by the horizontal scale? by the vertical scale? How many points will you plot? Connect the points with straight lines from left to right. |  |

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| Step 5: | **Give the graph a title.** |
|  | What is your graph about? |

Example 2:

The table below shows daily temperatures for Toronto, recorded for 6 days, in Celsius degrees.http://www.mathgoodies.com/lessons/graphs/images/tab.gif

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| **Temperatures In Toronto** | |
| **Day** | **Temperature** |
| 1 | 40° C |
| 2 | 55° C |
| 3 | 60° C |
| 4 | 40° C |
| 5 | 43° C |
| 6 | 38° C |

The data from the table above has been summarized in the line graph below.

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| Practice Questions: |

Ask your teacher for graph paper to construct each scenario as a line graph.

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| Deborah bought a new car in 2016 for $23,000. The dollar value of her car changed each year as shown in the table below. |
| http://www.mathgoodies.com/lessons/graphs/images/tab.gif | |
| |  |  | | --- | --- | | **Value of Deborah's Car** | | | **Year** | **Value** | | 2016 | $23,000 | | 2017 | $20,470 | | 2018 | $18,570 | | 2019 | $16,670 | | 2020 | $11,770 | | 2021 | $9,870 | | 2022 | $ 5,170 | |

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| Question 2: | Don Mills Collegiate has a swim team. The table below shows the winning times for the 7 competitions for the 400 meter free style swim. Construct a line graph to visually display this data. |
| http://www.mathgoodies.com/lessons/graphs/images/tab.gif | |
|  | |  |  | | --- | --- | | **400-Meter freestyle swim** | | | **Competition** | **Winning Time (seconds)** | | 1 | 6.2 | | 2 | 8.8 | | 3 | 9.5 | | 4 | 5.5 | | 5 | 13.3 | | 6 | 6.0 | | 7 | 15.1 | |

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| Strand 4 Lesson 2 Assessment: |

Question 1:

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|  | Royal Bank published its interest rates each day for 7 days as shown in the table below. Construct a line graph to visually display this data.  Ask your teacher for graph paper. |
| http://www.mathgoodies.com/lessons/graphs/images/tab.gif | |
|  | |  |  | | --- | --- | | **Royal Bank Interest Rates** | | | **Day** | **Interest Rate (%)** | | 1 | 1.700 | | 2 | 1.523 | | 3 | 1.475 | | 4 | 1.275 | | 5 | 1.100 | | 6 | 1.322 | | 7 | 1.121 | |

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| Hint: | There are 5 steps for constructing a line graph. These steps are listed below. |
| http://www.mathgoodies.com/lessons/graphs/images/tab.gif | |
|  | |  |  | | --- | --- | | **Procedure for Constructing a Line Graph** | | | Step 1: | Find the range in values. | | Step 2: | Determine a scale. | | Step 3: | Label the graph. | | Step 4: | Plot the points and connect them. | | Step 5: | Give the graph a title. | |

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| Question 2: | In 2015 Bill 31 was passed. This Bill, also known as the Distracted Driver, state that “it is illegal to talk, text, dial or e-mail using hand-held phones and other hand-held communication and entertainment devices, while driving”. The table below shows the number of tickets issued to drivers who were caught using their cellphones between 2009 and 2015.  Use the table below to construct a line graph. Ask your teacher for graph paper. |
| http://www.mathgoodies.com/lessons/graphs/images/tab.gif | |
|  | |  |  | | --- | --- | | **Cell Phone Use While Driving in Ontario** | | | **Year** | **Number of People** | | 2009 | 500 | | 2010 | 545 | | 2011 | 400 | | 2012 | 765 | | 2013 | 356 | | 2014 | 300 | | 2015 | 190 | |