Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Student Exploration:** **Graphing Skills**

**Vocabulary:** bar graph, line graph, negative relationship, pie chart, positive relationship, scale, scatter plot, variable

**Prior Knowledge Questions** (Do these BEFORE using the Gizmo.)

1. Four kinds of graphs are shown in this Gizmo. Circle the kinds you have seen before.

   

  **Bar graph Line graph Pie chart Scatter plot**

1. Where have you seen graphs used? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Why do you think graphs are useful? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Gizmo Warm-up: Using the *Graphing Skills* Gizmo**

1. The *Graphing Skills* Gizmo starts with a bar graph on the right and a data set on the left. Practice using the Gizmo by doing the following:
* Write a title.
* Label the vertical and horizontal axes.
* Change the **scale** of the vertical axis.
* Drag the bars up and down.
1. Use the **Graph type** dropdown list to select other kinds of graphs. Practice with each type of graph:
	* On the **Line graph** drag the points up and down.
	* On the **Pie chart** change the size of each slice by dragging the edges.
	* On the **Scatter plot** drag points from the data table to the graph.

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| **Activity A:** **Bar graphs** | Get the Gizmo ready:* On the **Challenge** menu, select **Create graph**.
* On the **Graph type** menu, select **Bar graph**.
* If necessary, click **New** until **Animal speed data** appears.
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**Goal: Build a bar graph based on a data table.**

1. Create graph: A bar graph is useful for comparing things, such as how fast animals can run.
* Write a title for the graph. (Look at the title of the data table for a suggestion.)
* Label the horizontal axis and the vertical axis.
* Pick what you think is the best choice for a vertical axis scale.
* Drag each bar to match the data in the table. Do your best to estimate heights.
1. Check your work: Click **Check** to see how well you did.
	* 1. What was your accuracy score? (Over 90 is excellent.) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		2. What vertical scale did you choose? (In other words, how much does each horizontal line on the graph represent?) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Revise: Click **Show value on mouseover**. Move the cursor over each bar to see its value. Adjust each bar and click **Check** until the accuracy score is 100. To show your work, click the **camera** () icon to take a snapshot. Right-click the image, and click Copy Image. Paste the screenshot into a blank document.
3. Interpret: Which of these animals is fastest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Slowest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Apply: Click **New** and make the next bar graph. Adjust the scale if needed and don’t forget to make a title and label each axis. Click **Check** to see your accuracy.
	* 1. What country has the highest life expectancy? The lowest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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* + 1. Does anything about the graph surprise you? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Challenge yourself: Hold a contest with your classmates. Turn off the **Show value on mouseover** checkbox and click **New**. Who can create the most accurate bar graph?

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| **Activity B:** **Line graphs and pie charts** | Get the Gizmo ready:* Under **Graph type** select **Line graph**.
* If necessary, click **New** until **Temperature data** appears.
 | 630SE7 |

**Goal: Build a line graph and a pie chart.**

**Line graphs**

1. Create graph: Line graphs are often used to show how something changes over time. Write a title and label the axes. Adjust the vertical scale if needed. Create the line graph by dragging the points up and down.
2. Check your work: Click **Check**. What was your accuracy score? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Revise: Turn on **Show values on mouseover** and adjust the graph until your score is 100. Take a screenshot of your graph and paste it into a document.

1. Interpret: Which day was hottest? \_\_\_\_\_\_\_\_\_\_\_\_\_ Which day was coolest? \_\_\_\_\_\_\_\_\_\_\_\_\_
2. Apply: Try additional line graphs until you are comfortable making this type of graph. Discuss the most interesting graphs with your teacher and classmates.

**Pie charts**

1. Create graph: Pie charts are used to show proportional data. Under **Graph type** select **Pie chart**. Make sure that **Show values and labels** is checked. Write a title for the pie chart and drag the pie pieces to match the data table.
2. Check your work: Click **Check**. Revise your pie chart if necessary. When the pie chart is correct, paste a screenshot of the chart into your document.
3. Interpret: What were the most popular pies? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Apply: Try additional pie charts until you are comfortable with this type of graph. For a *real* challenge, try to make a pie chart with the **Show values and labels** checkbox turned off.
5. Extend your thinking: The Gizmo also allows you to create a data table from a graph. Under **Challenge** select **Create table**. Write a title for the table and then fill in each empty box based on the graph. Click **Check** to check your accuracy.

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| **Activity C:** **Scatter plots** | Get the Gizmo ready:* Under **Challenge** select **Create graph**.
* Under **Graph type** select **Scatter plot**.
* If necessary, click **New** until **Studying and score data** appears.
 | 630SE8 |

**Goal: Create a scatter plot.**

1. Create graph: Scatter plots are used to see if one **variable** is related to another. Each point on a scatter plot has two values. For example, if Robert studied for 40 minutes and got a quiz score of 98, Robert’s point would be placed at (40, 98) on the graph. (You can think of that as “over 40, up 98.”) To make a scatter plot, do the following:
* Write a title for the graph.
* Label the horizontal axis based on the *second* column of the data table, and the vertical axis based on the *third* column of the data table. Include units in each label.
* Adjust the horizontal and vertical axis scales if needed.
* Drag each point to match the data.
1. Check your work: Click **Check**. What was your accuracy score? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Revise: Turn on **Show values on mouseover** and adjust the graph until your score is 100. Adjust the axis scales if necessary. Paste a screenshot of your graph into a document.

1. Interpret: Based on this graph, will studying help you do well on a test? Explain.

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1. Extend your thinking: The “Studying vs. Score” scatter plot shows an example of a **positive relationship**—as one variable increases, so does the other. The points in this type of scatter plot tend to go “uphill” from left to right.

A **negative relationship** is the opposite—as one variable increases, the other variable decreases. These types of scatter plots go “downhill” from left to right.

* 1. Which graphs in the Gizmo show a positive relationship? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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* 1. Which graphs in the Gizmo show a negative relationship? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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