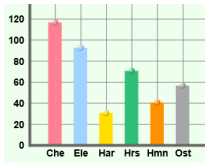Name: _____   Date: _____

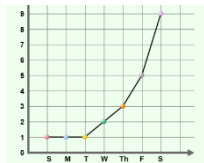# Student Exploration: Graphing Skills

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

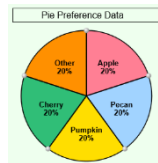**Prior Knowledge Questions** (Do these BEFORE using the Gizmo.)

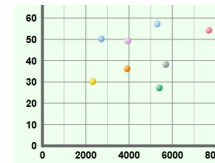1. Four kinds of graphs are shown in this Gizmo. Circle the kinds you have seen before.

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

2. Where have you seen graphs used? _____

_____

3. 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.
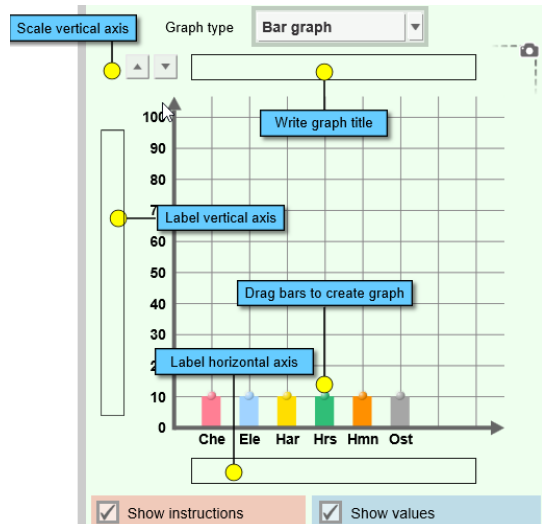
2. Use the **Graph type** dropdown list to select other kinds of graphs. Practice with each type of graph:
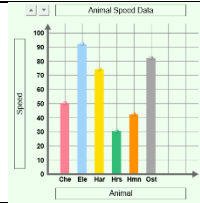
   - On the **Line graph** drag the points up and down.

   - 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.

	Get the Gizmo ready:
Activity A: **Bar graphs**	• On the **Challenge** menu, select **Create graph**. • On the **Graph type** menu, select **Bar graph**. • If necessary, click **New** until **Animal speed data** appears.

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.

2. Check your work: Click **Check** to see how well you did.

   A. What was your accuracy score? (Over 90 is excellent.) _____

   B. What vertical scale did you choose? (In other words, how much does each horizontal

   line on the graph represent?) _____

3. 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.

4. Interpret: Which of these animals is fastest? _____ Slowest? _____

5. 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.

   A. What country has the highest life expectancy? The lowest? _____

   _____

   B. Does anything about the graph surprise you? _____

   _____

6. 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?
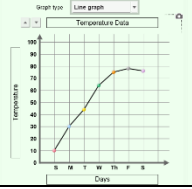
Activity B: **Line graphs and pie charts**	<u>Get the Gizmo ready</u>: • Under **Graph type** select **Line graph**. • If necessary, click **New** until **Temperature data** appears.

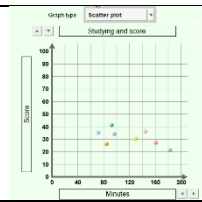**Goal: Build a line graph and a pie chart.**

Line graphs

1. <u>Create graph</u>: 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. <u>Check your work</u>: Click **Check**. What was your accuracy score? _____

3. <u>Revise</u>: 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.

4. <u>Interpret</u>: Which day was hottest? _____ Which day was coolest? _____

5. <u>Apply</u>: 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

6. <u>Create graph</u>: 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.

7. <u>Check your work</u>: Click **Check**. Revise your pie chart if necessary. When the pie chart is correct, paste a screenshot of the chart into your document.

8. <u>Interpret</u>: What were the most popular pies? _____

9. <u>Apply</u>: 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.

10. <u>Extend your thinking</u>: 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.

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

Goal: Create a scatter plot.

1. <u>Create graph</u>: 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.

2. <u>Check your work</u>: Click **Check**. What was your accuracy score? _____

3. <u>Revise</u>: 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.

4. <u>Interpret</u>: Based on this graph, will studying help you do well on a test? Explain.

   _____

   _____

5. <u>Extend your thinking</u>: 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.

   A. Which graphs in the Gizmo show a positive relationship? _____

      _____

   B. Which graphs in the Gizmo show a negative relationship? _____

      _____