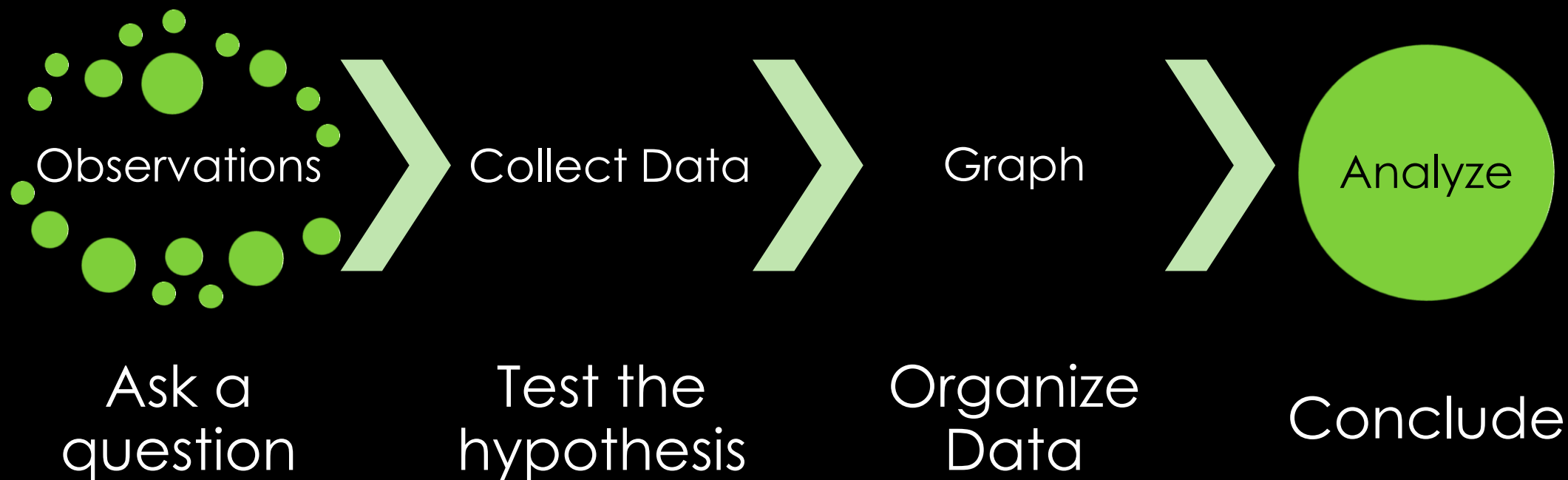


Representing Data




How do scientists make sense of data?

- There are many different types of investigations, but all have one thing in common – they all collect data.
- Data are the facts and figures – the evidence that is gathered
- The more data collected, the stronger the evidence – however – that data needs to be organized!
- How to do it? The most common method is with a data table.


Data table set up:

Guidelines for Making a Data Table


In most cases, the independent variable (that which you purposefully change) is in the left column, the dependent variable (that which you measure) with the different trials is in the next columns, and the derived or calculated column (often average) is on the far right. Reaffirm that rows are a series of horizontal cells and that columns are a series of vertical cells.



Title: Clearly state the purpose of the experiment (e.g., The effect of ____ (independent variable) on ____ (dependent variable)).



Independent Variable (unit)	Dependent Variable (unit)			Derived Quantity (unit)
	Trial 1	Trial 2	Trial 3	



Note: This data table format is adapted from *Students and Research* (Cothron, Giese, and Rezba, 2000).

Data table example:

Example

Title: The pH of Common Household Substances

Substance	pH			Average pH
	Trial 1	Trial 2	Trial 3	
Lemon juice	2.4	2.0	2.2	2.2
Baking soda	8.4	8.3	8.7	8.5
Orange juice	3.5	4.0	3.4	3.6




Independent Variable



Dependent Variable

Graphs and Data

- Graphing requirements –
 1. Axis labels
 2. Unit designations
 3. Title
 4. Legend or key
- An explanation about the results, or what the graph shows

Graphs Handout:

- Let's read through and find the important information, then take look at the example graphs



Graphing and Analyzing Scientific Data

Graphing is an important procedure used by scientist to display the data that is collected during a controlled experiment. There are three main types of graphs:

Pie/circle graphs: Used to show parts of a whole.

Bar graphs: Used to compare amounts.

Line graphs: Use to show the change of one piece of information as it relates to another change.



Both bar and line graphs have an "X" axis (horizontal) and a "Y" axis (vertical).

Parts of a Graph:

Title: Summarizes information being represented in ANY graph.

Independent Variable: The variable that is controlled by the experimenter, such as, time, dates, depth, and temperature. This is placed on the X axis.

Dependent Variable: The variable that is directly affected by the I.V. It is the result of what happens as time, dates, depth and temperature are changed. This is placed on the Y axis.

Scales for each Variable: In constructing a graph, one needs to know where to plot the points representing the data. In order to do this a scale must be employed to include all the data points. This must also take up a conservative amount of space. It is not suggested to have a run on scale making the graph too hard to manage. The scales should start with 0 and climb in intervals such as, multiples of 2, 5, 10, 20, 25, etc...the scale of numbers will be determined by your data values.

Now for our first Gizmo Lab!

Graphing Skills HTML5 Lesson Info + Add to Class

Challenge: Create graph Scale vertical axis Graph type: Bar graph

Animal	Spd (km/h)
Cheetah	112
Elephant	40
Hare	56
Horse	72
Human	34
Ostrich	66

Export Check New

The data shows how fast various kinds of animals can run. Create a bar graph to represent the data.

Write graph title
Label vertical axis
Drag bars to create graph
Label horizontal axis

Show instructions Show values

Tools

Lab Page – how to read gizmo lab pages:

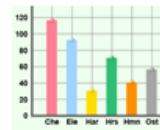
- Prior knowledge section – do BEFORE starting the lab
- Let's do this now.

Student Exploration: Graphing Skills

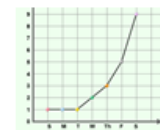
Vocabulary: bar graph, line graph, negative relationship, pie chart, positive relationship, scale, scatter plot, variable

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.



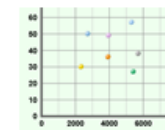
Bar graph



Line graph



Pie chart



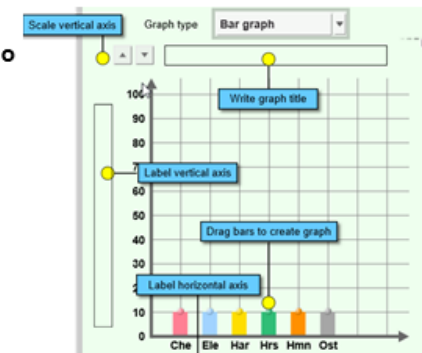
Scatter plot

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.



Warm up

- This section usually helps you to understand how that particular lab works
- It's practice before applying

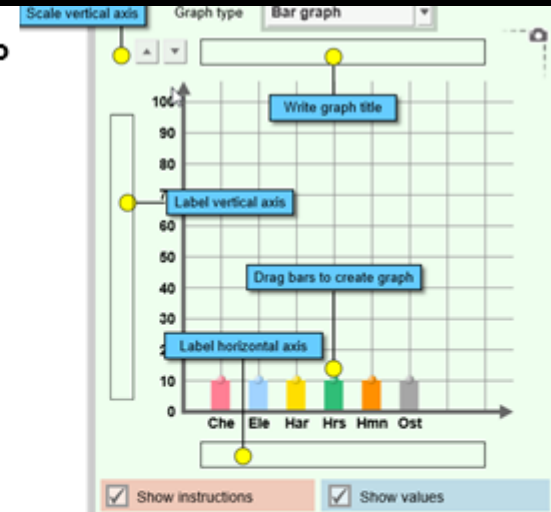
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1. The *Graphing Skills Gizmo*™ starts with a bar graph on the right and a data set on the left. Practice using the Gizmo by doing the following:

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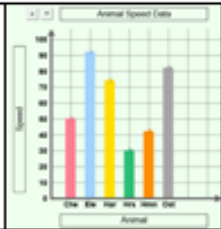
2. Use the **Graph type** dropdown list to select other kinds of graphs. Practice with each type of graph:

- 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.



The rest of the pages:

- Check out the boxes at the top of each page – the instructions help you to figure out how to set up the settings to get the proper results.
- It also tells you the goal of the activity

<p>Activity A: Bar graphs</p>	<p><u>Get the Gizmo ready:</u></p> <ul style="list-style-type: none">• On the Challenge menu, select Create graph.• On the Graph type menu, select Bar graph.• If necessary, click New until Animal speed data appears.	 <table border="1"><caption>Animal Speed Data</caption><thead><tr><th>Animal</th><th>Speed</th></tr></thead><tbody><tr><td>Elk</td><td>50</td></tr><tr><td>Bear</td><td>90</td></tr><tr><td>Wolf</td><td>75</td></tr><tr><td>Fox</td><td>30</td></tr><tr><td>Owl</td><td>45</td></tr></tbody></table>	Animal	Speed	Elk	50	Bear	90	Wolf	75	Fox	30	Owl	45
Animal	Speed													
Elk	50													
Bear	90													
Wolf	75													
Fox	30													
Owl	45													

Goal: Build a bar graph based on a data table.

Gizmo Lab instructions:

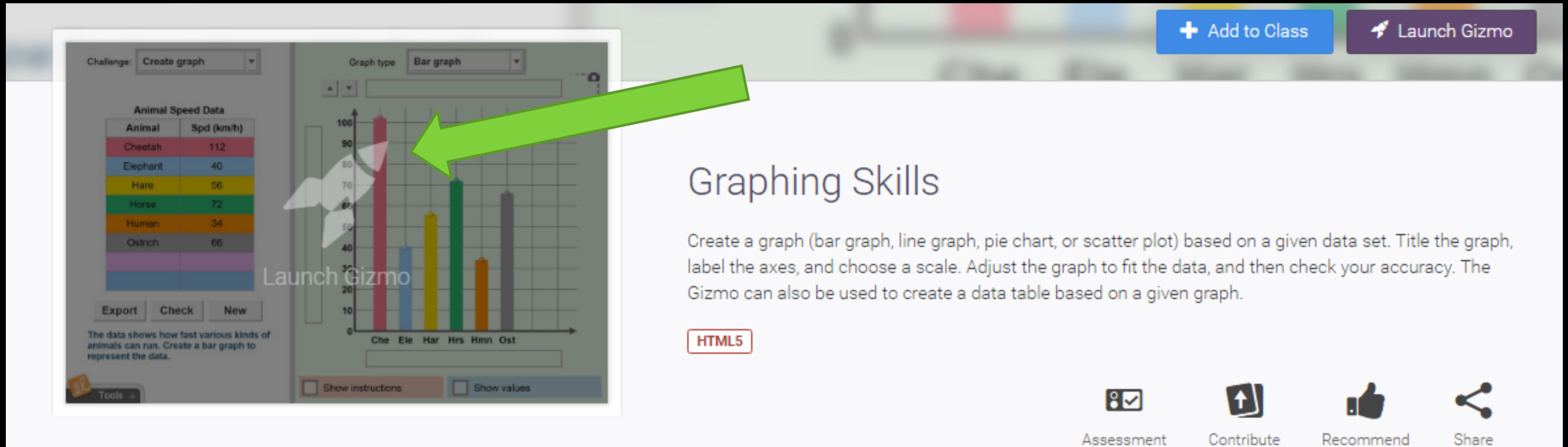
- One you have your assigned computer, go through these steps:
 1. Find your passwords page in your binder
 2. Log on to the internet and then go to teacher's website
 3. Once on the website, go to the current unit (1) and scroll down the page until you see the gizmo lab button
 4. When you click the button, it will take you to the explore learning website.
 5. Log in with your user name and password

Find your class, there are a list of labs, look for the graphing skills lab and click on “HTML5”

The screenshot shows a navigation bar with tabs for 'My Homepage', 'Period 1', 'Period 3', 'Period 4', 'Period 5', 'Period 6', 'Period 7', and 'Period 8'. Below the navigation bar, the page title is 'Period 1: 7th grade', with links for 'Class Roster (26)' and 'Manage Class'. A list of labs is displayed, each with an icon, a title, an 'HTML5' button, and options for 'Lesson Info' and 'Launch'. A green arrow points to the 'HTML5' button for the 'Graphing Skills' lab.

Lab Title	HTML5 Button	Lesson Info	Launch	Progress
Graphing Skills	HTML5	Lesson Info	Launch	
Food Chain	HTML5	Lesson Info	Launch	1
Evolution: Natural and Artificial Selection	HTML5	Lesson Info	Launch	1
Photosynthesis Lab	HTML5	Lesson Info	Launch	
Dichotomous Keys	HTML5	Lesson Info	Launch	1
Digestive System	HTML5	Lesson Info	Launch	1

Here is the lab, click on “Launch Gizmo” to start the lab



Challenge: Create graph

Graph type: Bar graph

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Cheetah	112
Elephant	40
Hare	56
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Ostrich	66

Export Check New

The data shows how fast various kinds of animals can run. Create a bar graph to represent the data.

Tools

Show instructions Show values

Graphing Skills

Create a graph (bar graph, line graph, pie chart, or scatter plot) based on a given data set. Title the graph, label the axes, and choose a scale. Adjust the graph to fit the data, and then check your accuracy. The Gizmo can also be used to create a data table based on a given graph.

HTML5

Assessment Contribute Recommend Share

[+ Add to Class](#) [Launch Gizmo](#)

Follow along on your page to complete the lab

Complete lab:

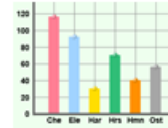
Name: _____ Date: _____

Student Exploration: Graphing Skills

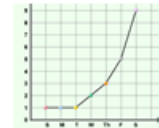
Vocabulary: bar graph, line graph, negative relationship, pie chart, positive relationship, scale, scatter plot, variable

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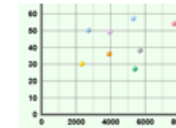
Bar graph



Line graph



Pie chart



Scatter plot

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