

Data and Analytics
Module 5 Lessons 5.11-13

Context of the Lesson	
<p>The Big Idea: Students will learn how to process data using computers, how it is stored, and how to pull information from that data.</p>	
<p>Prerequisite Knowledge and Skills:</p> <ul style="list-style-type: none"> • Knowledge of computing devices • Using computing devices for everyday tasks • Basic understanding of how use computing devices 	<p>Connections to SOLs:</p> <ul style="list-style-type: none"> • Computer Science 5.11-13 • Math 5.16, 5.17, 5.19a • Math Models VS 1c and 1j
Objectives of the Lesson	Formative Assessment
<p>Learning Targets (I can...):</p> <ul style="list-style-type: none"> • I can identify inputs that gather data • I can gather data and collect it • I can create artifacts to model attributes and behaviors • I can use numbers to represent other things 	<ul style="list-style-type: none"> • Extended time on assignment • Verbal testing • Selective student seating • Group and individual activities • Instructional aids • Written testing
Materials	
<ul style="list-style-type: none"> • Visual Aid for instructor to write on (e.g., chalkboard, projector, dry erase board, easel) • Handouts for students (optional) • Computer (optional) 	
Lesson Structure and Activities	
<p>Warm Up [5-10min], answers to be written out by instructor on visual aid</p> <p>Ask: Have you ever participated in a survey?</p> <ul style="list-style-type: none"> • Responses will vary. It may be good to mention the US Census for this lesson. <p>Ask: Have you ever made a chart, spreadsheet, or diagram?</p> <ul style="list-style-type: none"> • Responses will vary. (Programs like Microsoft Excel, LibreOffice Calc, and Google Sheets count.) 	
<p>Launch (Engage) [10-20min] :Teacher Directed Instruction:</p> <p>Vocabulary:</p> <p>Data – Values and facts used, applied, or processed toward a purpose. Computers store much of their information in data, including media.</p> <p>Data refers to information in a form that can be utilized for some purpose. Facts and statistics are data. Music and videos are data. A text file that says “hula hoop” is also data. Anything you can save on a computer is data.</p> <p>Discuss methods of data collection in normal life such as surveys and records. Microwave clocks, weight scales, and measuring tape. All of them take in some kind of data input and return responses. Information is constantly gathered from the outside world by machines, sorted into useful categories, and then processed to inform decisions. Data inputs and outputs are so common, many don't realize they use them every day. A measuring stick or tape shows the length of something and returns it in units we use like inches and meters. Digital thermometers gather data on the heat in our homes and measure temperature. Global Positioning System (GPS) satellite networks gather information on where two places are and use math to turn it into directions on how to go between those two places. They can also inform you how busy an area is by counting all the connected people there.</p>	

Many people, whether or not they realize it, use this concept in their lives. If you don't know what is going to happen next, you may find yourself guessing based on what usually happens. You captured information from your memories, transformed it into usable data, and made a prediction. It can be as simple as guessing when a school bus will arrive or when a bell will ring.

Discuss how data is used for prediction and inference (specifically statistics). Optionally, brush the students up on probability, as it plays a key role. Show that the accuracy of predictions is based on how realistic the interpretation of data is. Like a scientist in the field, a data scientist must observe data and make the correct assumptions. For example, if it is really windy around October and the leaves keep turning brown and falling down, the correct assumption is that it is Fall, not that the October wind is poisoning the trees. Show that given a proper quantity of data, results are often far more accurate.

Instruct students about how they can use these techniques. You can eat out if you know what restaurants are around you. You can order food more quickly if you know the menu. You can get to the front of the line faster if you know when it is at its longest. You can enjoy your food more if you know what food you like. All of these, the searching, the menu reading, the rush hour knowledge, and your own personal taste are all information collected when deciding something as simple as "I want some fast food".

Explain data visualization like pie charts, bar charts, line graphs. While they have great uses in math and science, they are very useful in data analysis. They let you express ideas without using raw numbers, which is very helpful in communicating those ideas. Line graphs let you show how something has changed over time. Bar charts make great comparisons. Pie charts can show someone how much of something is taken up by one group. By using the right data visualization you can share an idea using a picture rather than a number.

Explore [10-25min] :Joint/Guided Practice | Student Practice:

- [Let students practice using online graphing learning resources.](#)

Summarize [5-10min] :Debrief :

- Ask: Name some way you can gather data.
- Ask: When was a time you saw a chart or had to make a chart that explained something using a picture?

Extensions: