Lesson 3.4: Data Science - Part 1

Objectives

In this lesson, students will:

- Gain an understanding of data science
- Practice data collection via interviews
- Learn about and practice data categorization, and data visualization using charts

Agenda

1. Data Science	10 mins
2. Student Activity: Data Collection - What is your favorite dessert?	20 mins
3. Student Activity: Categorize and Visualize the Data Collected.	15 mins
4. Wrap Up and Reflections	5 mins

Preparation

- ❑ Projector to show chart examples
- ❑ Print student activity worksheets (one per team)

Resources & Links

- ❑ None

1. Data Science

Engage students in a teacher led discussion and instruction**:**

Prompt students: Can anyone tell me what data is?

Data are facts and statistics collected, usually for reference purposes or analysis. For example, a Summer camp will record how many kids signed up so they know how many t-shirts to order, or a school might collect how many students like sports so they know how many PE teachers to hire.
Have you ever wondered how a grocery store decides which cereal to put on the middle, top or bottom shelf? Do you think it is random?

Grocery stores collect data to learn about their customer habits. They then categorize the data. And finally they use the data to make assumptions and predict customer behaviour. This can make the shopping experience easier, but mostly it is so that they can sell more groceries.

Typically, children's cereals are on the bottom shelves and adult cereals on the taller shelves. Through data collection, a grocery chain discovered that some stores had low adult cereal sales. So they changed the cereal aisle layout into adult and children sections which increased adult sales because it was easier for more senior adults to find cereals they like.

This is what we call **Data Science**: using processes and algorithms to obtain information and insights from the data that was collected or simply to analyze data collected to extract useful information.

Explain to students that they will engage in an experiment where they use Data Science to collect data and make some discoveries by categorizing and organizing the data.

2. Student Activity: Data Collection - What is your favorite dessert?

Note: For this activity, it would be helpful if you have access to another class for the interview questions. This could perhaps be agreed upon ahead of time or be done as a homework assignment ahead of time. Otherwise, the interview can be conducted within the class.

Activity Description:

Students team up in groups of 2-4. Students use the worksheet provided to interview other students to collect data on dessert preference.

If the interview will be conducted within the class, you may want to select a subset of teams to conduct the interview first, then the next set of teams and so on, so that not all teams are trying to interview and be interviewed at the same time.

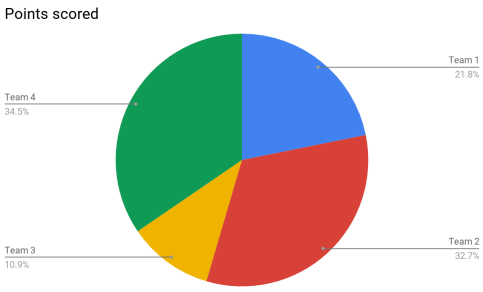
Explain the activity to students and distribute the activity worksheet.

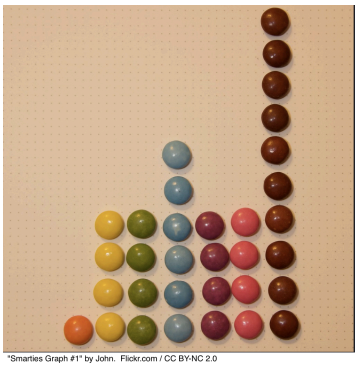
3. Student Activity: Categorize and Visualize the Data Collected

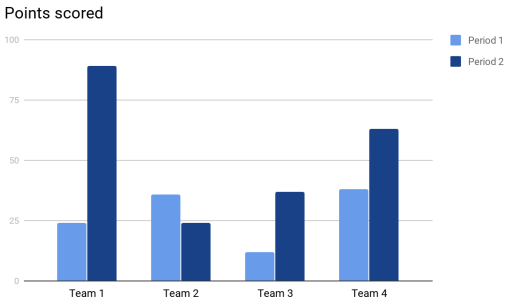
Explain to students that they will categorize and create visual representations of the data they collected. In this activity they will only work with the dessert data. Explain what it means to categorize data (organize things into groups that share the same feature or have something in common).

To visualize data, one can use bar charts (vertical or horizontal), tally tables and pie charts. **Prompt** students to show or explain what these representations look like.

To explain to students what these data representations are, it might be useful to show the below examples (available in Exhibit A for display).




"Smarties Graph #1" by John. Flickr.com / CC BY-NC 2.0



Favorite Pets	
Dogs	𝍸 ||
Cats	𝍸 |
Birds	||
Fish	|

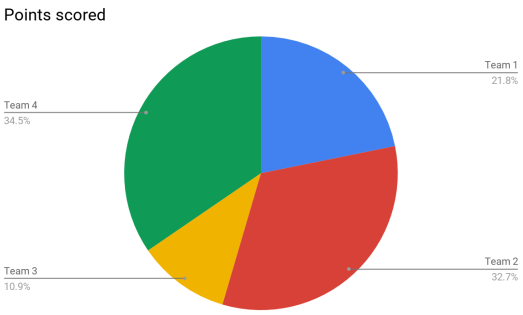
Distribute the Activity Worksheet: Categorize and Visualize the Data Collected. Students work with the same teams as the data collection teams.

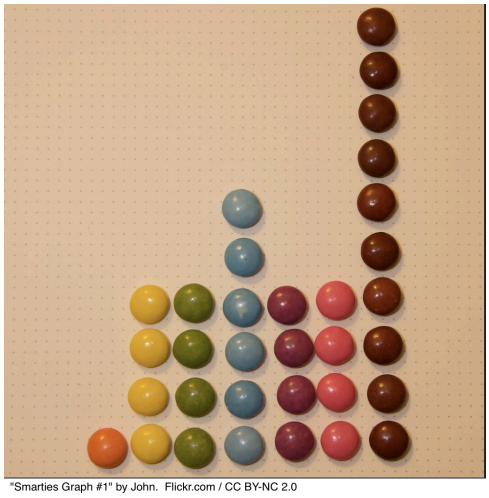
4. Wrap Up and Reflections

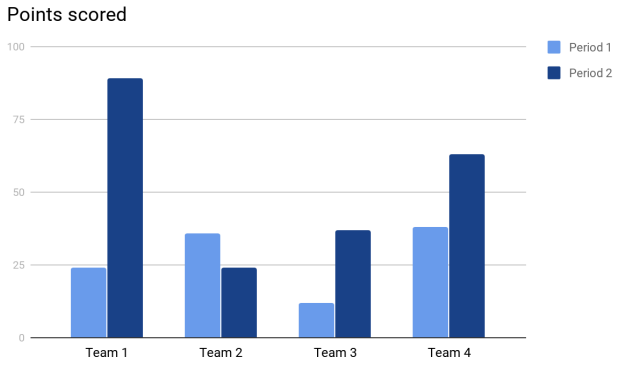
Reflection Points:

- What did you learn during this lesson?
- What is data science?
- Which graph type did your team use? Why?
- Did you have more than 3 items in the 'Other' category? If you did, what might be a good follow up question to get more data during the interview?

Exhibit A: Data Visualization Examples




"Smarties Graph #1" by John. Flickr.com / CC BY-NC 2.0



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Student Activity Worksheet: Data Collection

What to do:

- ❑ Interview at least 10 people using the interview sheet. Ask the following question and circle the answer on the questionnaire (questions form):

  Which of the following is your favorite dessert?

  - ❑ Chocolate chip cookies,
  - ❑ Cake,
  - ❑ Ice cream,
  - ❑ Other (something else)

- ❑ Next, ask the person:

  Were you born in the **first half of the year** - January 1 to June 30 ? (answer is Yes on questionnaire)

  or

  Were you born in the **second half of the year** - July 1 to December 31? (answer is No on questionnaire)

Questionnaire

Person 1:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half : Yes No			
Person 2:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			
Person 3:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			
Person 4:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			
Person 5:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			
Person 6:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			
Person 7:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			
Person 8:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			
Person 9:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			
Person 10:	Chocolate chip cookies	Cake	Ice cream	Other (something else)
	First half: Yes No			

Student Activity Worksheet: Categorize and Visualize the Data Collected

What to do: **(only use dessert data)**

- ❑ In your journal, explore categorizing the **desserts data collected**. A table might be useful or anything that will help you group the data.
- ❑ Next, visually represent your categories using 2 graph types (vertical or horizontal bar chart, pie chart or a tally table)
- ❑ Discuss with your teammates which graph you believe gives the best visual representation?
- ❑ Be prepared to share your findings with the class.