

(<http://csmatters.org/pd-new>) C - 04

0bC - 0b100

Data Acquisition: Modelling and Simulation



Unit Concept Lessons

Revision Date: Oct 19, 2017

Duration: 60 50-minute sessions

Lesson Summary

Summary: Teachers will begin this lesson by journaling about how to create meaning out of data. They will then look at examples of nonsensical connections between data. After that, they will be introduced to data science. Teachers will think about the tradeoffs involved with data, as well as other uses of data. They will consider algorithms used with data collection and do a writing activity.

Outcomes:

Teachers will:

- Understand the basics of statistics and data science
- Understand the pros and cons of data, and how it is used in the modern world
- Learn the basics of algorithms as they relate to utilizing data in a meaningful way

Overview:

(Total: 60 minutes)

1. Journal Activity
2. Data Presentation
3. Discussion
4. Writing Activity

Learning Objectives

Teacher Resources

CL04_Data Acquisition: Modeling and Simulation Folder (<https://drive.google.com/open?id=0B5vAY-fhOT-idnFmNmdb1d5d0U>)

Lesson Plan

TOTAL: 60 minutes

Instructor should use the presentation "Data Acquisition; Modeling and Simulation" to guide this lesson.

Journal Activity

Describe at least 2 ways that we create meaning out of data.

- Possible answers include, but are not limited to: graph it, total, average, min and max, map it, find trends, generate predictions, etc.

Data Presentation

Show sample graph and discuss: Does this data have meaning?

- Subquestions:
 - Does eating margarine cause divorce in the state of Maine?
 - Does less divorce in Maine lead to fewer people buying margarine?
- What facts can we state from this data?

Show some other examples of data connections that may be statistically valid, but the representations do not make sense.

Introduce data science and show two videos explaining what a data scientist is and what a data scientist does (~3 min).

Discussion

Discuss and consider: What considerations and tradeoffs arise in the computational manipulation of data?

- Flying a space mission is a good example to use here. (One thing that has to be tested prior to space missions is the effects of sound on the equipment! Don't want anything breaking.)

Discuss: what are some other ways data is used?

- See if anyone knows how Netflix, movie makers, or Amazon use data about their customers to be more successful.
- See if anyone knows the story of Moneyball (based on a true story) of how a baseball team made decisions based on data analysis to become winners.

Data analysis requires an algorithm. Consider what possible algorithm Netflix could use to suggest movies to a customer.

- Describe at least 2 calculations needed.
- Describe some of the data you would need to collect.

Writing Activity

2 options: What is a possible algorithm for making a decision about choosing:

- What movie to produce?

OR

- What sports player to hire?

Have teachers choose one of two options to write an outline for an algorithm.

- Describe at least 2 calculations needed.
- Describe some of the data you would need to collect.

Share and discuss.



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