Data Science for everyone! FY16

Please find a top level outline of proposed curriculums. Each course assumes the teacher is able to dedicate a minimum of 30 minutes per day over a period of two weeks (a total of 5 hours).

Each course is designed so that there is an easy jump off point for the student to continue learning on their own at home.

# 1. Building a predictive model using azure and machine learning

## Description

This course will teach students the fundamentals of data science and will take students through creating their own predictive model using Azure ML

The goal of this course will be to introduce students to the field of data science and show them how it’s possible to create models that can be used in their everyday lives!

By the end of the course each student will have the understanding of how to apply data science fundamentals to real-world problems.

## Course Outline

* Science, Math, and Programming (Class 1)
* What is the science in data science?
  + Real world examples
  + Reading Graphs
  + Framing the problem
  + In/dependent Variables
* What is the data/math in data science?
  + Features
  + Variable Selection
  + Modules and judging accuracy (random guessing benchmark)
  + Tools/Languages
* What is *the cloud?*
* Intro to Microsoft Azure
  + About Azure, Technology Behind it
* Azure Account Setup (Class 2)
  + Creating free Microsoft Azure Account via DreamSpark/Imagine
  + Activating Azure and create Dev Journals using WordPress
* Intro to Azure ML/Predicting the weather/Used Car Example/Students Grades (Class 3)
  + Importing data
    - Show open data portals
  + Feature Selection
  + Model Creation(use random guessing as benchmark)
  + Interpreting Results
  + Visualizations (Class 4)
    - Raw
    - Excel
* Optional/Advanced
  + Questions on each individual topic
  + Work in teams to solve one of 3 other data science problems (Class 5-6)
    - Present findings to the class (Class 7)
  + Next Steps: Imagine Cup, RetroHacks/Experiments (Maria creating content)

## Advantages

* Introduces students to cloud Azure cloud and open source technologies
* Helps student metric by generating signups and activations in Azure.

## Goal

The goal here is to introduce students to data science in a fun way by using Azure ML. If successful students can incorporate these techniques into other projects they are working on.

## Why is this cool for Middle School Students?

Students can learn how to apply their skills in math to real world problems! They will not be learning the theory behind data science and machine learning, but rather how they can apply it to their day to day curiosities. Want to know what kind of people play Minecraft? Or what about the weather, can we predict how it will be in 10 years in a certain area? Students will learn the tools they need to address their endless curiosity about the world they live in.

## Does this solve common core requirements?

We know that accomplishing the Core Standards for math can be difficult, so here are some of the ones this course looks to touch on.

<http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf>

### **Mathematical Practices**

* Make sense of problems and persevere in solving them.
* Reason abstractly and quantitatively.
* Construct viable arguments and critique the reasoning of others.
* Model with mathematics.

### **Grade 7**

#### Ratios and Proportional Relationships

* Analyze proportional relationships and use them to solve real-world and mathematical problems.

#### Expressions and Equations

* Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

#### Statistics and Probability

* Draw informal comparative inferences about two populations.
* Investigate chance processes and develop, use and evaluate probability models.

### **Grade 8**

#### Expressions and Equations

* Understand the connections between proportional relationships, lines, and linear equations..

#### Functions

* Define, evaluate, and compare functions.
* Use functions to model relationships between quantities.

#### Statistics

* Investigate patterns of association in bivariate data.

## Feedback from Middle school teachers/students?

(This to be gathered soon)

## How much azure pass $$ is needed to be successful? (pass quantity?)

30 $100 dollar passes per class. Ideally, these would last for six months or a year, so students could continue to explore Azure ML on their own.

## What do teachers do after teaching the content? Is there next steps for them?

After teaching the content, students can try to work on different projects on their own. The course provides resources for datasets and problems that the students can play around with and try to solve. Teachers can dedicate class time to specific problems they might find interesting. Classes can also have competitions for the best visualization, as well as, the best overall solution.