Data and Modelling: Unit Overview

MTH1W, Grade 9 Mathematics (De-streamed), Unit 7. 10 classes of 75 minutes, plus one class for the unit test (about two weeks). The culminating task follows this unit.

The big question

How do we collect, represent and analyse data, and use mathematical models to answer real questions?

Students examine big data in apps, schools, transit and the census, and the consequences of its collection, storage, representation and use. They learn what a mathematical model is and the four-step modelling cycle, analyse one-variable data with the mean, median, mode, range, quartiles and box plots, and compare data sets. They create scatter plots, describe correlation, test linear and exponential regression models in Desmos or a spreadsheet, and judge predictions. They read and alter Python code that finds the five-number summary, then pose a question of interest, plan data collection and build and judge a model, launching the culminating task. The summative, Box Plot Showdown, compares two paper airplane designs with box plots and a regression model.

Lessons

#	Lesson	Classes	Question	Expectations	What's inside
1	**Big Data in Our Lives**	1	Who collects our data, and what happens next?	D1.1	Trackers, school platforms, fare cards, the census
2	**What Is a Mathematical Model?**	1	How does math help us decide?	D2.1	The modelling cycle; the pizza model
3	**Centre and Spread**	1	What is typical?	D1.2	Mean, median, mode, range; outliers
4	**Quartiles and Box Plots**	1	What do five numbers show?	D1.2	Five-number summary; IQR; Desmos
5	**Comparing Data Sets**	1	Which group is faster?	D1.2	Ruler-drop showdown; two towns
6	**Scatter Plots and Correlation**	1	Do two variables move together?	D1.3	Arm span and height; correlation vs cause
7	**Testing Regression Models**	1	Which model fits best?	D1.3	Linear vs exponential; the cooling tea
8	**Coding with Data**	1	Can code summarize data?	D1.2, C2.2, C2.3	Five-number summary and mean in Python
9	**Asking a Good Question**	1	What makes a question worth modelling?	D2.2, D2.3	Questions, sources, assumptions, plans

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10	**Building and Judging a Model**	1	How good is our model?	D2.4, D2.5	The melting ice block; culminating launch

Assessment

Type	In this unit
Assessment for learning	Data Estimates, The Pizza Model, Sleep Data, Screen Time Box Plot, Ruler-Drop Showdown, Arm Span and Height, Fit a Line, Read the Code, Question Workshop, Model the Ice, quick checks and exit tickets
Assessment as learning	Self-checks, My Data Context, My Data Plan, Judge a Report
Assessment of learning	Summative task (Box Plot Showdown) with a rubric, and a unit test with full solutions

Materials

Included:

- **Original data and graphs:** every data set, scatter plot, box plot and diagram was created for this unit
- **Code:** two short Python programs (any free Python editor, or trace on paper)
- **Start Here:** unit overview, summative task and rubric, unit test, and teacher solutions for both

Free tools only: rulers, Desmos (free) or a free spreadsheet, and any board-approved Python editor. All data sets are fictional; any class data collection is voluntary and anonymous.

What's in each lesson

- Teacher lesson plan with expectations, timed sequence, differentiation, look-fors and answer guides
- Slides with speaker notes
- Student handouts and organizers
- Editable Word and PowerPoint files, plus PDFs

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