Year 9 – Data science

Unit introduction

In this unit, learners will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. Learners will be exposed to both global and local data sets and gain an understanding of how visualising data can help with the process of identifying patterns and trends. Towards the end of the unit, the learners will go through the steps of the investigative cycle to try to solve a problem in the school using data.

Overview of lessons

Lesson	Brief overview	Learning objectives
Lesson 1: Delving into data science	The aim of this lesson is to introduce the learners to data science, and in particular, how visualising data can help us to provide insights that may not be as obvious when looking at raw data. The learners will investigate a couple of historical examples that highlight the value in visualising data, before using an online tool to help them visualise a small data set of TV viewing figures in order to gain an insight. The lesson will conclude with learners looking at a data set and deciding what it would be useful to visualise. The homework is then to visualise that data.	• Define data science • Explain how visualising data can help identify patterns and trends in order to help us gain insights • Use an appropriate software tool to visualise data sets and look for patterns or trends

Lesson 2: Global data	The previous lesson gave learners an introductory level of understanding of the purpose of data science. In this lesson, they will gain a better understanding of how ever-improving advances in technology have made it more feasible to collect, store, and analyse much larger data sets than previously. The learners will look at global data sets, make predictions, and use visualisations of the global data to prove or disprove their predictions, as well as to investigate anomalies and outliers in the data.	• Recognise examples of where large data sets are used in daily life • Select criteria and use data set to investigate predictions • Evaluate findings to support arguments for or against a prediction
Lesson 3: Statistical state of mind	The focus of this lesson is to introduce the learners to the investigative cycle PPDAC (problem, plan, data, analyse, conclusion) and apply part of this cycle to a data set about roller coasters. The learners start this lesson where they left off, by analysing a graph from a world data set. The graph will be used to highlight the correlations in the data and to investigate outlying data. After being introduced to PPDAC, the learners will be given a scenario to investigate what would make a cool roller coaster. They will refine the problem into questions they can investigate, visualise the data, analyse, and report on their findings.	• Define the terms 'correlation' and 'outliers' in relation to data trends • Identify the steps of the investigative cycle • Solve a problem by implementing steps of the investigative cycle on a data set • Use findings to support a recommendation
Lesson 4: Data for action	In this lesson, the learners will develop their understanding of the investigative cycle by investigating a problem themselves. They will do this by investigating the problem of litter in their school. They will work through the first two steps of the cycle (problem and plan). To do this, they will pose questions and think about what data they will need to answer those questions. Learners will then make an electronic data capture form, on which they will go on to enter the data that they have collected. Following this lesson, the learners will work through the remaining steps of the cycle to complete the investigation of the problem.	• Identify the steps of the investigative cycle • Identify the data needed to answer a question defined by the learner • Create a data capture form

Lesson 5: Clean it up	In this lesson, learners will continue to develop their understanding of the investigative cycle by working through the data and analysis steps of the PPDAC cycle, using their own problem and the data that they are investigating. The lesson starts with a practical exercise that gives the learners some experience of data cleansing, to help them understand the problems that inaccurate data can pose for data analysis. The learners will then download the data they have collected and clean it before uploading it to CODAP, where they will analyse it further by creating visualisations. In this lesson, the learners will start to find some answers to the questions that they posed previously. It will also act as a platform for them to start drawing the conclusions they need to draw in the next and final lesson of the unit.	• Describe the need for data cleansing • Apply data cleansing techniques to a data set • Visualise a data set
Lesson 6: Make a change	In this lesson, the learners will complete their school litter project by working through the final steps of the PPDAC cycle (analysis and conclusions). The lesson begins with the learners looking at an example visualisation. They will be encouraged to think about what they can learn from the data, as well as what additional information would be helpful for them to know. This will model the thought process they need to go through when analysing and concluding their projects. The learners will take an end-of-unit assessment before thinking about how they could apply what they have learnt in a context that is relevant to them and their lives.	• Visualise a data set • Analyse visualisations to identify patterns, trends, and outliers • Draw conclusions and report findings

Progression

Curriculum links

National curriculum links

- Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users.