Creating new variables by calculation in Excel

This planning document is intended to support teachers who are delivering the NPA/PDA Data Science or for students who are learning independently. It also aligns with the Data Skills for Work framework.

The lesson has been designed for learners using Microsoft Excel. Most of the information in the lesson will work for other spreadsheets tools. However, if another tool is being used by the learners (such as Google Sheets) the step-by-step instructions will need to be adjusted.

Contents

Lesson Description

Lesson Overview	Creating new calculated variables
Topic	Data manipulation
Book Chapter(s)	"Data transformation and Manipulation"

NPA level	4, 5, 6
PDA level	7, 8
Data skills for work level	Core, Analysis

Lesson Contents

This lesson consists of:

- A lesson plan (this document)
- A PowerPoint/PDF presentation, 'Creating new variables by calculation in Excel'
- Question worksheet (for learners) on 'Creating new variables by calculation in Excel' in Excel
- Answers worksheet (for teachers) on 'Creating new variables by calculation in Excel' in Excel

Learning Intentions

We will be learning how to create new variables in Excel, specifically,

- understand what it means to **create a new variable by performing calculations** using existing data

- how to create simple new variables by performing a calculation in Excel

- understand the **concept of conditional statements** for creating new variables.

Success Criteria

I can *describe* how to create a new variable by performing calculations.

I can *create* new variables in Excel by performing calculations.

I can *describe* the concept of conditional formulas.

I can *use* conditional formulas in Excel.

Knowledge Prerequisites

Learners should know:

- How to open/save an Excel file

- That Excel documents have worksheets and use rows/columns

- To be able to enter data into cells

- To be able to select/highlight sections of data

- Headers on worksheet (e.g. A,B,C,D and rows 1,2,3,4)

- Excel has ribbons at the top for Home, Data, Formulas etc

- To be able to right-click on cells to see options

Lesson Requirements

	PDA	**NPA**	**Data Skills for work**
Qualification	Yes	Yes	Yes
Outcome ID(s)	WD8.3b, WD8.3c, CD8.1g, WD7.2a, WD7.2b, CD7.3a	DS4.2c, DS4.3a, DS5.2c, DS5.3c, DS6.2b, DS6.3c	C2.1, A1.2, A2.1, A2.3
Outcome description(s)	WD8.3b Types of data transformation WD8.3c Transformations CD8.1g Preparing data for visualisation WD7.2a Types of data transformation WD7.2b Common transformations including filtering, sorting CD7.3a Preparing data for visualisation *N.B. out of scope of this lesson,* *"WD8.3c ... including joins"* *"WD7.2b ...including filtering, sorting.... and grouping"*	DS4.2c Describe simple methods of cleaning and transforming data DS4.3a Perform simple data cleaning and structuring DS5.2c Describe methods of cleaning and transforming data DS5.3c Perform routine data cleaning and structuring. DS6.2b Explain techniques for data capture, cleaning and transformation including data modelling DS6.3c Perform data transformation to complete, correct and structure data *N.B. out of scope of this lesson,* *"DS4.3b ... including sort, filter, group and summarise."* *"DS5.3d ...including sort, filter..., group and summarise."*	C2.1 Vocabulary used in data science and analytics A1.2 Data quality A2.1 Use of tools to analyse data A2.3 Data calculation and manipulation *N.B. out of scope of this lesson "A1.1....quantitative and qualitative"*

Level	7, 8	4, 5, 6	Core, Analysis
Software language	Excel	Excel	Excel
Required equipment /software for student	Lesson: PowerPoint, Worksheet: Excel	Lesson: PowerPoint, Worksheet: Excel	Lesson: PowerPoint, Worksheet: Excel

Task-types

In the worksheet for this lesson, there are up to 6 task-types to that become increasingly challenging to support the students learning. Based on the student's previous knowledge it is possible to select the task-types that are relevant to their stage.

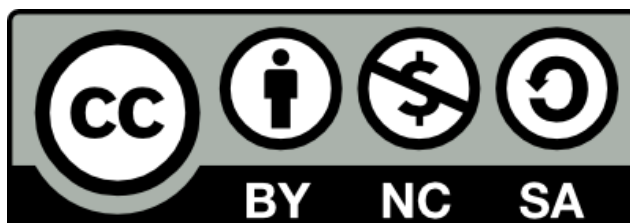| Task-type	Description
1. Recall	To be able to recognise definitions or procedures.
2. Define	To be able to define definitions or procedures.
3. Rephrase	To be able to use their own words to describe definitions or procedures.
4. Apply	To be able to apply definitions or procedures to problem-solving activities.
5. Create	To be able to apply definitions or procedures and create their own solutions to a defined problem.
6. Active	Using knowledge from the lesson which they apply to scenarios they have researched/designed themselves.

Worksheet

The worksheet associated with this lesson is available either in Excel or as a PDF that can be printed. The answer worksheet is available in both formats too.

Worksheet section ID	Description	Task-type	Number of questions
1.1	Variables	Recall	3
1.2	Variables	Apply	1
2.1	Create by calculation	Recall	1
2.2	Create by calculation	Rephase	1
2.3	Create by calculation	Apply	6
2.4	Create by calculation	Apply	2
2.5	Create by calculation	Create/Active	1
3.1	Conditional statements	Recall	1
3.2	Conditional statements	Apply	1
3.3	Conditional statements	Apply	5
3.4	Conditional statements	Active	1
Total			**23**

How you can use this lesson

This lesson has been created by Effini in partnership with Data Education in Schools, The Data Lab and Data Skills for Work, with funding from the Scottish Government.