Lesson Plan for: Excel – Data Analysis (Sample)

Delivery Format: Online/In-Person

Program Portal Catalog ID #: Click here to enter text.

Target Audience(s):

☒Older Adults Ages 65+	☒Adults Ages 19-64	☒Teens Ages 12-18
☐Preteens Ages 10-11	☐School Age 5-11	☐Preschool Ages 3-5
☐Toddlers Age 19-36 Months	☐Babies/Toddlers Ages 0-18 Months	☐Families

Focus Area: Continual Learning for Adults

Program Objectives:

Basic Functions
Data Cleaning
Sort and Filter
Advanced Functions
Pivot Tables

Introduction:

Click here to enter text.

Closing:

Click here to enter text.

Program Time:

Preparation: 2 Hours

Delivery: Online

Online requirements: Zoom meeting link, Computer (either laptop or desktop computer) or phone if participant wants to dial in, link to supplementary materials for participants, link to online evaluation.

Resources: Click here to enter text.

Delivery Format: Online (Expand if teaching online)

- **Collapse this section if you are teaching this class in-person.**

Online Setup (staff): 30 minutes Prior to Program Start

- Online setup & troubleshooting time

- Lead facilitator should join the Zoom Room used to schedule the program.
  - Primary: **DigiLit Zoom Account**
    - Username: cmldigitalinclusion
    - Password: Digital4ever
  - Secondary (if schedule conflict) **Adult Services Zoom Account**
    - **Username:** adultservices.cml@gmail.com
    - **Password:** Adult2020
  - Link (for co-facilitator/participants): [Insert Link]
  - Give Co-host privileges to Library staff
    - *Zoom Pro Tip:* Can request or give remote control of your screen during program if co-facilitating. Can be enabled through entire program.
  - Paste into Zoom chat box:
    - Welcome to [program topic]! We'll get started in just a few minutes.
    - Link to Class Handout on Digital Branch page (if available)
    - Link to Activity Sheet on Digital Branch page (if available)
- [*Optional*] Log in to staff OneDrive account https://www.office.com/ while teaching to demonstrate the Microsoft 365 free version (Microsoft Edge browser recommended)
  - Username: cmlvirtualcomputerclasses@outlook.com
  - Password: CM!techt3am
  - Create or duplicate a OneDrive workbook containing activities from the Activity Sheet if applicable

Online Introductions [6 minutes]

***PowerPoint Slides**

- Launch PowerPoint Intro [insert link to ppt] & share screen
- Staff introductions (point out who is monitoring chat for questions, etc.)
- Participant Introductions:
  - Ice-breaker activity (Example: Your name; Why do you want to learn Excel? What version of Excel are you using today?)
- Recording disclaimer (if applicable)
- **Hit Record Button**
- Review of navigating Zoom and procedures:
  - Attendee Controls in a Meeting
    - Mute: All participants will be muted at the start of the call.
    - Raise hand: If participant wants to speak, use the raise hand feature and the moderator will ask the person to unmute their mic and speak (microphone option in center of screen)
    - Settings: Add in your name
    - Encourage to turn on video, but not required
    - Chat: open chat feature
- Quick Tips for Online Programs (Windows)

- **Alt** + **Tab** (Switch between open apps. Hold down Alt key and press Tab to select)
- **Ctrl** + **Alt** + **Tab** (Use the arrow keys to switch between all open apps, OR click)
- **Ctrl** + **Tab** (Switch between tabs in browser. Hold down Ctrl key and press Tab to select)
- Press and hold **Windows Logo** key, press the **left** or **right arrow** key (will arrange open windows side by side)

Delivery Format: In-Person (Expand if teaching in-person)

- **Collapse this section if you are teaching online.**

In-Person Introductions [6 minutes]

***PowerPoint Slides**

- Launch PowerPoint Intro [insert link to ppt]
- Staff introductions
- Participant Introductions:
  - Ice-breaker activity (Example: Your name; Why do you want to learn Excel? What version of Excel are you using today?)

Topic Introduction [-minutes]

***PowerPoint Slides**

- Objectives – from PowerPoint slide
- Project – Create a personal webpage

Suggested Activity: Go to

***Continue with PowerPoint or turn off slides and switch to demonstration or share screen**

What is Data Analysis? [-minutes]

Data analysis is the process of gathering, cleaning, and modeling data to reveal meaningful insights. This data is then crafted into reports that support the strategic decision-making process.

Suggested Activity: Click or tap here to enter text.

Dataset [-minutes]

Open the dataset sent by email. The data set is a list of fighters.

So far, we've talked about "rows" and "columns" since these are common features of "tables". Because Excel is a visual interface, these terms are commonly used. But there are some terms that are more often used in Analytics.

A column is better known as a **variable**. A row of data is known as an **observation**, since each row represents something that was observed. For the current dataset, each observation represents a fighter who is trying to save the world. This is known as the dataset's **level of detail (variable with unique values: Character Name)** and is very important to identify before beginning an analysis.

Suggested Activity: Click or tap here to enter text.

Basic Functions [-minutes]

Change tabs to the Basic Functions tab. Let's go over the following functions.

Sum - Adds numbers in a range.

=SUM

Average - Calculates the average (arithmetic mean)

=AVERAGE

Min - Finds the lowest number in a range

=MIN

Max - Finds the highest number in a range

=MAX

Count - Counts cells with numbers in a range

=COUNT

Counta - Counts all cells in a range that has values, both numbers and letters

=COUNTA

Median - Returns the middle value in the data

=MEDIAN

Suggested Activity:

Answer the following questions.

1. Find the Sum of HP

=SUM(D2:D13) (1680)

2. What is the Average Level?

=AVERAGE(C2:C13) (12.25)

3. What is the Minimum Attack?

=MIN(F2:F13) (5)

4. What is the Maximum Speed?

=MAX(J2:J13) (15)

5. How many characters are there?

=COUNTA(A2:A13) (12)

6. What is the Median Defense?

=MEDIAN(H2:H13) (8.5)

Data Cleaning [-minutes]

Data cleaning involves preparing your data for analysis by ensuring it's in a usable format. This includes removing blank cells, eliminating duplicates, and standardizing formats.

First, let's check the spelling

(I made the following spelling errors in the Data Cleaning tab)

E7 (Sord should be Sword)

E3 (Clawz should be Claws)

L8 (Brake should be Break)

L2 (Kross should be Cross)

Click on Review → Spelling (In the Proofing Group) and fix the above errors.

Second, remove the empty rows. There are 5 empty rows. Select the entire dataset, and add a filter to the first row (Home → Sort and Filter → Filter). Click the **Select All** checkbox to deselect all of them. Then select just **Blanks**, then **OK**. Select **first row**, then press **CTRL+SHIFT+END** to select all rows. Right-click the selected rows and then click Delete Rows. Finally, on the Data tab, click Clear, then click Filter.

Third, remove the duplicate rows. There are several duplicate rows (5 and 6), (9 and 10), (14 and 15). Select the entire dataset, then go to Data → Remove Duplicates. We can select columns that have duplicates. Let's click Unselect All, then click on Character Name, then click OK. That removes three of the duplicates. Then remove the filter by clicking on Data → Sort and Filter → Filter. Unchecking a column means that it will not remove duplicates for that column.

Last, let's trim the whitespace. If you look in column L, there are two spaces between the words, when there should only be one.

Select all the data using CTRL+SHIFT+END.

On the Home tab, click Find & Select (in Editing tab), then Replace.

In Find what, type 2 spaces. In Replace with, type 1 space.

Click Find All, then click Replace All.

Click the Close icon.

Finally, our data has been cleaned!

Suggested Activity: Create another if statement. See below

Sort and Filter [-minutes]

Now that the data has been cleaned, we can move on to sorting and filtering. Click on the Sort and Filter tab.

Let's practice Filtering. How many characters have a Magic power of 6?

How many characters have a Luck of 7?

How many characters have 130 HP?

How many characters are either Level 12 or 13?

Show class how to sort Character Name by A to Z order. Then Z to A order. (Add a filter, then click on the filter arrow. Click Sort A to Z, then click Z to A.

Practice a custom sort

Advanced Functions [-minutes]

Here are some of the most common functions a Data Analyst might use
IF - returns values based on a **true** or **false condition**
=IF(**logical_test**, **[value_if_true]**, **[value_if_false]**)
The **condition** is referred to as logical_test, which can check things like:

- If a number is **greater than** another number >
- If a number is **smaller than** another number <
- If a number or text is **equal** to something =

IFS - returns values based on one or more **true** or **false conditions**
=IFS(**logical_test1**, **value_if_true1**, **[logical_test2, value_if_true2]**, **[logical_test3;** ...)

COUNTIF - returns the count of cells in a range that meet a single condition
=COUNTIF(range, criteria)
=COUNTIF(Where do you want to look?, What do you want to look for?)

SUMIF - calculates the sum of values in a range based on a **true** or **false condition**.
=SUMIF(**range**, **criteria**, **[sum_range]**)

The **condition** is referred to as criteria, which can check things like:

- If a number is **greater than** another number >
- If a number is **smaller than** another number <
- If a number or text is **equal** to something =

The [sum_range] is the range where the function calculates the sum.
The [sum_range] is optional. If not specified, the function calculates the sum of the same range as the condition.

Advanced Functions Practice [-minutes]

If - If a character has a defense of 10 or higher, they can fight the boss. Add a new column named “Ready for the Boss Fight?” in Column M.
=IF(H2>=10,"Yes","No") Use the AutoFill to automatically fill in the below cells.

Ifs - If a character has a speed of 12 or higher, they are "Fast". If their speed is 8 to 11, they are "Normal". If their speed is less than or equal to 7, they are "Slow". Add a new column named “Speed Category” in Column N.

=IFS(J2>=12,"Fast",J2>=8,"Normal",J2<=7,"Slow")

CountIf – How many characters have HP over 140?
=COUNTIF(D2:D13, ">140") The answer is 5

How many characters have a magic or 9 or less?
=COUNTIF(G2:G13, "<=8") The answer is 9

VLOOKUP Function [-minutes]

VLOOKUP is a function in Excel that helps you find a piece of information based on another value in a table... VLOOKUP works by searching down the first column of a table to find a match. Once it locates that match, it retrieves data from the specified column of the same row.

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])
Lookup_value: What you want to look up.
Table_array: Where you want to look for it. Must be in the first column.
Col_index_num: the column number in the range containing the value to return. The input is the number of the column, counted from the left:
Range_lookup: return an Approximate or Exact match TRUE if numbers (1) or FALSE if text (0).

*If someone asks about XLOOKUP, it is an improved version of VLOOKUP that works in any direction and returns exact matches by default, making it easier and more convenient to use than VLOOKUP. However, XLOOKUP is not available in Excel 2016 and Excel 2019. I am using VLOOKUP since it is compatible with any Excel version and students may not have the current Excel version.

*HLOOKUP (Horizontal Lookup) in Excel is a built-in function that enables users to find data in tables horizontally. HLOOKUP is useful in scenarios where you need to retrieve information from a data set that is arranged in rows rather than columns.

Pivot Table [-minutes]

A PivotTable is an interactive way to quickly summarize large amounts of data.

In order to use a PivotTable, you must first turn format the data as a table

On the **Home** tab, in the **Tables** group, click **Format as Table**.

Select **Light Gray, Table Style Medium 15**. Select any cell in the table, then click Insert → PivotTable

Move Character Name to Rows, Move Enemies to Values.

Let's insert a chart. Click anywhere in the PivotTable. Click Insert → Recommended Charts (In the Charts group)

Insert a Slicer: PivotTable Analyze → Filter → Insert Slicer

Finding More Help [- minutes]

- Demonstrate how to access the Excel help menu
- Encourage use of online help
- Share other resources (Northstar, LinkedIn Learning, GCFLearnFree, etc.)

Project Outcome Survey [- minutes]

- Explain ProjectOutcome.org's initiative and its impact on public libraries as an incentive to complete the Survey - helps libraries understand and share the impact of programs and services. Surveys are anonymous.
- Ask participants to complete the online Project Outcome Survey before ending or leaving the meeting by placing link in chat.
- [Insert Link]

*Resources Referenced

- Insert resources referenced for your class, such as GCF Learn Free or LinkedIn Learning