Cochise College Center for Lifelong Learning

Excel: with AI

Using Google Gemini

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Introduction

Welcome to Excel with AI! In the Excel Basic class you learned how to navigate a spreadsheet, write formulas, and work with data. In this class, you will discover how to use an AI assistant to do those same things faster, more powerfully, and without memorizing complex formula syntax.

Today's AI tool is **Google Gemini**, a free conversational AI you can use in any web browser. You will describe what you want in plain English, and Gemini will suggest formulas, answer questions about your data, teach you Excel features you have never used, and help you find problems you might otherwise miss. By the end of the class, you will use Gemini to help design a brand new spreadsheet from scratch.

Learning Goals

By the end of this class, you will:

- Understand what AI can and cannot reliably do with spreadsheet data
- Use Gemini to generate Excel formulas from plain English descriptions, including conditional formulas like IF and SUMIF
- Use Gemini as a tutor to explain formulas and fix formula errors
- Ask Gemini to analyze a dataset, then check its answers with a PivotTable
- Use Gemini to identify and fix data quality problems in a messy file
- Design and build a new spreadsheet with Gemini's help
- Apply the verify-and-iterate habit that every AI user needs

What You Need

- Computer with Microsoft Excel and a web browser
- USB drive with Student Files (provided by instructor)
- A free Google account for Gemini access

Module 1: AI and Excel: Setting the Stage

Before we start asking AI to help with spreadsheets, let's understand what it is good at, where it falls short, and how our workflow will look today.

What AI Does Well in Excel

- **Writing formulas**: describe what you want to calculate and it writes the formula
- **Explaining formulas**: paste any formula and it will explain it in plain English
- **Fixing errors**: paste a formula that shows an error and it will usually spot the problem
- **Teaching features**: ask how to do something in Excel and get step-by-step instructions
- **Analyzing data**: paste a table of data and ask questions about it
- **Finding data problems**: identifying inconsistent values, duplicates, and formatting errors
- **Recommending charts**: suggest the right chart type for your data

Where AI Falls Short

- **It can be confidently wrong.** AI can write a formula that looks correct and runs without errors but produces the wrong answer. You must always verify the output.
- **It lacks your business context.** It does not know your fiscal year, your company's definitions, or any special rules your organization uses.
- **It needs clean data.** Merged cells, blank rows, and inconsistent spellings confuse AI just as they confuse Excel.
- **It cannot see your screen.** Gemini only knows what you type, paste, or upload. It cannot change your Excel file; you make every change yourself.
- **Its menu directions may not match your Excel.** Excel looks a little different from version to version. If Gemini names a button you cannot find, tell it which version of Excel you are using.

The Verify-and-Iterate Habit

Every time you use AI output in your spreadsheet, follow these three steps:

1. **Verify**: does the result look right? Check a few values by hand.

2. **Iterate**: if something is wrong, describe the problem back to the AI and ask it to correct the formula.
3. **Apply**: once verified, use AutoFill or copy the formula across the data.

Treat AI like a knowledgeable colleague who sometimes makes mistakes. Trust but verify.

Protect Your Privacy

Anything you paste or upload into a free AI tool may be stored and reviewed to improve the product. Before you share a spreadsheet with Gemini, ask yourself whether you would be comfortable posting it on a bulletin board. **Never paste** Social Security numbers, bank or credit card numbers, medical details, passwords, or other people's personal information. For a private spreadsheet, describe the column layout instead of pasting the data, or replace real names with made-up ones first. The datasets in today's class are fictional, so they are safe to share.

Activity 1.1: Set Up the Workspace

⚙ Open the Dataset and Gemini

1. Open **`monthly_sales.xlsx`** from the Student Files folder
2. Save a working copy as **`sales-ai`**
3. Review the column headers: *Month*, *Category*, *Units_Sold*, *Unit_Price*, *Total_Revenue*, *Returns*, *Net_Revenue*
4. Note that columns E (Total_Revenue) and G (Net_Revenue) are blank; you will fill these with AI-generated formulas
5. Open your web browser and go to `https://gemini.google.com`
6. Sign in with your Google account
7. You should see a chat interface with a text box at the bottom: this is where you will type your questions
8. Arrange your screen so you can switch quickly between Excel and the browser. Pressing **[Alt]** + **[Tab]** jumps between the two windows.

Activity 1.2: Get to Know Gemini

💬 A Warm-Up Conversation
Before working with data, get comfortable with how Gemini responds.

1. In the Gemini chat box, type the following and press **[Enter]**:

   I am an older adult taking a beginner class on using AI with Microsoft Excel. In two or three short paragraphs, what are the most useful ways you can help me with spreadsheets, and what should I be careful about?

2. Compare Gemini's answer with the two lists above. Did it mention anything new? Did it warn you about anything?
3. Notice the icons under the response. You can copy the answer, give it a thumbs up or down, or ask Gemini to try again.
4. To start a fresh conversation later, click *New chat*. Gemini remembers everything earlier in the *current* chat, so staying in one chat for a project is usually helpful.

Module 1 Checklist

1. Name three things AI does well with spreadsheet data
2. Explain why you must always verify AI-generated formulas
3. Name two kinds of information you should never paste into an AI tool
4. Open Gemini in a web browser and hold a short conversation

Module 2: Generating Formulas

The most immediately useful thing AI can do in Excel is write formulas for you. Instead of looking up syntax, you describe what you want to calculate in plain English and Gemini writes the formula.

Activity 2.1: Ask Gemini for a Formula

💬 Describe Your Data and Ask for Help
You do not need to paste the entire spreadsheet. Just describe the column structure.

1. Click in the Gemini chat box

2. Type the following prompt and press **[Enter]**:

   I have an Excel spreadsheet with these columns: A=Month, B=Category, C=Units_Sold, D=Unit_Price, E=Total_Revenue (blank), F=Returns, G=Net_Revenue (blank). The data starts in row 2. What formula should I put in cell E2 to calculate Total Revenue, which is Units Sold multiplied by Unit Price?

3. Read Gemini's response carefully. It should give you a formula like `=C2*D2`.
4. Switch to Excel and click cell **E2**
5. Type the formula Gemini suggested and press **[Enter]**
6. If necessary, double-click between the header for columns E and F to auto-fit the column to the content.
7. Click back on **E2** and look at the Formula Bar to confirm the formula
8. Verify the result: row 2 is January Jewelry with 18 units at $42.00. The result should be **$756.00**
9. If the result is correct, double-click the AutoFill handle to fill the formula down the column

How to Write a Good Prompt

Getting useful answers from AI depends on how you ask. For Excel formulas, always include:

- Which columns contain which data (e.g., "A=Month, B=Category")
- Which cell you want the formula in (e.g., "cell E2")
- A plain English description of the calculation you need

If the first answer is not quite right, add more detail and ask again. This is the **iterate** step.

Activity 2.2: A Two-Step Formula

🖩 Net Revenue Requires More Detail

Net Revenue is not just a simple multiplication. It requires explaining the business logic.

1. In Gemini, type the following prompt and press **[Enter]**:

   Using the same spreadsheet (A=Month, B=Category, C=Units_Sold, D=Unit_Price, E=Total_Revenue, F=Returns, G=Net_Revenue), I need a formula for cell G2. Net Revenue equals Total Revenue minus the value of the returned items. A return means one unit at the unit price. Returns are counted in column F.

2. Read the response. The formula should be something like `=E2-(F2*D2)`.
3. Switch to Excel, click **G2**, enter the formula, and press **[Enter]**
4. Verify: January Jewelry had 18 units, $42.00 price, and 2 returns. Total Revenue = $756.00. Net Revenue should be $756.00 minus (2 × $42.00) = **$672.00**
5. If correct, use AutoFill to fill G2 down the column
6. Save the workbook

Activity 2.3: When AI Gets It Wrong

⚠ **A Demonstration of the Verify Step**
This activity demonstrates why verification matters.

1. In Gemini, type this deliberately vague prompt:

   I have sales data with units and price. How do I calculate revenue?

2. Notice that Gemini may give a formula with placeholder cell references like `=A2*B2` that would be wrong for your actual spreadsheet
3. This illustrates why your prompt must include the actual column letters and cell address
4. Ask a follow-up: *My units are in column C and price is in column D. The formula goes in cell E2.*
5. Gemini should now give the correct formula `=C2*D2`

Activity 2.4: A Formula That Makes a Decision

Flag Rows With High Returns Using IF
An **IF** formula checks a condition and gives one answer when it is true and a different answer when it is false. The store owner wants to spot any month and category with three or more returns.

1. In Excel, click cell **H1** and type the header **Return_Check**
2. In Gemini, send this prompt:

   > *In the same spreadsheet, column F holds the number of Returns. In cell H2, I want a formula that shows the word "Review" if Returns is 3 or more, and the word "OK" if it is less than 3.*

3. The formula should look like `=IF(F2>=3,"Review","OK")`. Enter it in **H2**.
4. Verify: January Jewelry had 2 returns, so H2 should say **OK**
5. AutoFill the formula down the column and spot-check one row that says **Review**
6. Now ask Gemini for one more formula: *What formula would count how many cells in H2:H61 say "Review"? I will put it in cell H63.*
7. Enter the **COUNTIF** formula Gemini gives you in **H63**. The answer should be **16**.

Activity 2.5: Build a Category Summary With SUMIF

Add Up Only the Rows You Care About
SUMIF adds the numbers in one column, but only for rows that match a condition in another column. You will build a small summary table off to the side of the data.

1. Click cell **J1** and type **Category**. In **K1**, type **Net_Revenue**.
2. In cells **J2** through **J6**, type the five categories: **Jewelry**, **Crafts**, **Clothing**, **Food Items**, **Minerals**
3. In Gemini, send this prompt:

   > *My category names are in B2:B61 and Net Revenue is in G2:G61. I made a summary table with category names in J2:J6. What formula should I put in K2 to total the Net Revenue for the category named in J2? I plan to AutoFill it down to K6.*

4. Enter the formula in **K2** and verify: Jewelry should total **$19,782.00**
5. Look closely at the formula. Do you see **$** signs, as in `$B$2:$B$61`? If not, ask Gemini: *Will this formula still work correctly when I AutoFill it down to K6?*
6. AutoFill K2 down to K6. Minerals, the last category, should total **$10,026.00**
7. In **K7**, enter `=SUM(K2:K6)`. The grand total should be **$71,850.00**
8. Save the workbook

Why the Dollar Signs Matter

When you AutoFill a formula, Excel shifts every cell reference down one row at a time. That is exactly what you want for `J2` (it should become J3, J4, and so on), but not for the data range. Without dollar signs, `B2:B61` would slide down to `B6:B65` by the time it reached row 6 and quietly skip the first rows of data. A **$** in front of the column letter and row number "locks" the reference so it never moves. This is called an **absolute reference**. It is one of the most common mistakes in Excel, and AI tools do not always remember it, which is one more reason to verify the last row of anything you AutoFill.

Activity 2.6: Use Gemini as Your Excel Tutor

🎓 **Understand the Formulas You Just Built**
Gemini is not only a formula writer. It is a patient teacher who never minds answering the same question twice.

1. Click cell **K2** and copy the formula from the Formula Bar
2. In Gemini, type *Explain this formula to me one piece at a time, as if I have never seen SUMIF before:* and paste the formula after it
3. Read the explanation. Does it match what you saw the formula do?
4. Now ask: *Give me a short practice problem using SUMIF with this same spreadsheet, but do not tell me the answer yet.*
5. Try to write the formula yourself in an empty cell such as **K10**. When you are done, ask Gemini to check your work.
6. If you have time, ask Gemini how **AVERAGEIF** and **COUNTIF** differ from

SUMIF

Activity 2.7: Fix a Broken Formula

🔧 Let Gemini Diagnose an Error
Sooner or later every Excel user sees an error such as `#DIV/0!` or `#NAME?`. Gemini is very good at explaining them.

1. Click cell **`J9`** and type the label **`Avg Jewelry Net`**
2. Click cell **`K9`** and type this formula exactly as shown, including the misspelling: `=AVERAGEIF(B2:B61,"Jewlery",G2:G61)`
3. Press **[Enter]**. You should see `#DIV/0!`
4. In Gemini, send: *In Excel, this formula shows #DIV/0! instead of a number. Why, and how do I fix it?* and paste the formula after it
5. Gemini should notice that "Jewlery" is misspelled, so no rows match and Excel has nothing to average
6. Correct the spelling. The result should be **$1,648.50**, the average monthly Net Revenue for Jewelry
7. Save the workbook

Tip: Appendix B lists the most common Excel error messages and a prompt to use for each.

Module 2 Checklist

1. Write a prompt that includes column letters, cell addresses, and a plain English description
2. Use Gemini to generate a formula and enter it correctly in Excel
3. Verify a formula result by checking it against a known value
4. Explain why a vague prompt produces an unreliable answer
5. Use IF, COUNTIF, and SUMIF formulas generated by Gemini
6. Explain why dollar signs (absolute references) matter when you AutoFill
7. Ask Gemini to explain a formula and to diagnose an error message

Module 3: Analyzing Data

Gemini can do more than write formulas. When you paste your data into the chat, you can ask it questions in plain English and get answers that would otherwise require complex formulas, filters, or PivotTables. Then, because AI can be confidently wrong, you will check its answers with a PivotTable.

Activity 3.1: Copy Data Into Gemini

Prepare the Data for Pasting

1. In Excel, press **[Ctrl]** + **[Home]** to go to cell A1. *Note: be sure the cursor is in cell A1*
2. Press **[Ctrl]** + **[A]** once. Excel selects the block of data from A1 through H61. Your summary table in columns J and K is *not* selected, because the empty column I separates it from the data.
3. Press **[Ctrl]** + **[C]** to copy
4. In Gemini, click *New chat* so this conversation starts fresh, then click in the chat box
5. Type the following, then press **[Shift]** + **[Enter]** to start a new line without sending:

   Here is sales data from a small gift shop. Please review it and then answer my questions.

6. Press **[Ctrl]** + **[V]** to paste the data below your message
7. Press **[Enter]** to send
8. Wait for Gemini to confirm it has read the data before continuing

Activity 3.2: Ask Simple Questions

? Get Answers Without Writing a Single Formula

1. Ask Gemini each of the following questions, one at a time, and write down the answers. You will check them in Activity 3.5.
   - *Which product category had the highest total Net Revenue?*
   - *What was the total Net Revenue for the Jewelry category?*

- *Which month had the highest total Units Sold across all categories?*
- *What was the average Units Sold per row?*
- *Which category had the most returns overall?*

2. After each answer, consider: does the result make sense? Could you verify it with a quick mental estimate?
3. You already have one answer you can check: compare Gemini's Jewelry total with cell **K2** in your summary table

Activity 3.3: Ask for a Summary

⊞ Get a Category-by-Category Breakdown

1. Ask Gemini:

   Can you show me a summary table with total Net Revenue and total Units Sold for each product category, sorted from highest to lowest Net Revenue?

2. Review the table Gemini produces: this is the kind of summary a PivotTable normally provides, delivered through a conversation
3. Ask a follow-up question based on what you see, for example:

   Jewelry had the highest revenue. Is that mainly because of higher unit price, or does it also sell the most units?

4. This kind of follow-up conversation is what makes AI analysis different from traditional formulas: you can keep asking until you understand the data

Activity 3.4: Get a Chart Recommendation

📊 Let AI Guide Your Visualization

1. Ask Gemini:

   I want to create a chart in Excel that shows how total Net Revenue varies by month, combining all categories. What type of chart do you recommend, and which columns should I select?

2. Gemini will recommend a chart type (likely a column or line chart) and

describe how to select the data

3. Switch to Excel and follow its recommendation to create the chart
4. Ask Gemini a follow-up question about the chart if anything is unclear
5. Once you have finished with the chart, delete it
6. Save the workbook

Activity 3.5: Check Gemini's Math With a PivotTable

Let Gemini Teach You the Tool That Checks Its Work
A **PivotTable** is Excel's built-in tool for summarizing data. It does real calculations, so it is the perfect way to verify Gemini's answers. You have never built one, so let Gemini teach you.

1. Ask Gemini: *Give me simple step-by-step instructions for creating a PivotTable in Excel that shows total Net_Revenue and total Units_Sold for each Category. My data is in A1:H61. Please keep it short.*
2. Follow Gemini's steps in Excel. In general, you will click inside the data, choose `Insert → Tables → PivotTable`, accept *New Worksheet*, and then drag fields into the *Rows* and *Values* boxes on the right.
3. If you get stuck, describe exactly what you see on your screen to Gemini and ask what to do next
4. When your PivotTable is finished, compare it with Gemini's summary table from Activity 3.3 and with your SUMIF table. The correct Net Revenue totals are:
   - Jewelry $19,782.00 Clothing $17,465.00 Crafts $13,867.00
   - Food Items $10,710.00 Minerals $10,026.00
5. Did Gemini get every number right? Check your other answers from Activity 3.2 as well: December had the most units sold (376), the average was about 50.9 units per row, and Jewelry had the most returns (36).
6. Click the *Monthly Sales* worksheet tab at the bottom of the window to return to your data, then save the workbook

Why Gemini Sometimes Gets the Math Wrong

Gemini is a language tool. When you paste data and ask a question, it may add the numbers up by "reading" them rather than truly calculating, especially in the free version. Sometimes it writes and runs a small program behind the scenes, which is far more accurate. Either way, you cannot tell from the answer alone. That is why a PivotTable or a formula should have the final say on any number that matters.

Activity 3.6: Upload the File Instead of Pasting

Give Gemini the Whole Workbook
Copying and pasting works for small tables, but Gemini can also read an Excel file directly.

1. Make sure your workbook is saved
2. In Gemini, click *New chat*
3. Click the + (Add files) button at the left of the chat box and choose *Upload files*
4. Navigate to your **`sales-ai.xlsx`** file and open it. Wait for the file name to appear in the chat box.
5. Type: *This is a year of sales data for a small gift shop. Which two months had the lowest Net Revenue, and what might explain that for a gift shop in southern Arizona?*
6. Check the first part of the answer: January ($3,201.75) and February ($3,072.50) were the lowest months
7. The second part of the answer is an opinion. Does Gemini's reasoning sound sensible? Remember that it does not know anything about this particular shop.
8. Ask: *Create a chart showing total Net Revenue by month.* Gemini may draw the chart right in the chat. Compare it with what you would build in Excel.

Note: Gemini's upload features change often. If your screen looks different, ask the instructor.

Activity 3.7: Turn Numbers Into Words

✎ Write a Summary for the Shop Owner
Numbers are only useful if someone understands them. Gemini is especially good at writing.

1. In the same chat, send this prompt:

   > *Write a short, friendly email to the owner of this gift shop summarizing the year. Include three observations backed by specific numbers from the data and one recommendation for next year. Keep it under 200 words.*

2. Read the email and underline every number it contains
3. Check each number against your PivotTable or your SUMIF table. A single wrong number in an email to your boss is embarrassing!
4. If anything is wrong, tell Gemini which number is incorrect and ask it to revise the email
5. Ask Gemini to rewrite the email for a different audience, for example: *Now rewrite it as three bullet points for a board meeting.*

The Limits of AI Data Analysis

When you paste or upload data into Gemini, keep these limits in mind:

- Gemini reads your data but cannot modify your spreadsheet directly
- Very large datasets may be partially cut off; paste a representative sample if needed
- Gemini's numbers may be estimates rather than true calculations. Verify important numbers in Excel.
- Gemini's explanations of *why* something happened are educated guesses, not facts about your business

Module 3 Checklist

1. Copy spreadsheet data and paste it into a Gemini prompt
2. Ask plain English questions and interpret the answers
3. Request a summary table and recognize it as an AI-generated alternative to a

PivotTable

4. Build a PivotTable by following Gemini's instructions, and use it to check Gemini's answers
5. Upload an Excel file to Gemini and ask questions about it
6. Have Gemini write a summary and verify every number in it

Module 4: Cleaning Data

Data cleaning is one of the strongest use cases for AI. Finding every inconsistent spelling, duplicate row, and formatting error by eye is tedious and error-prone. Gemini can scan a dataset in seconds and report problems you would likely miss.

Activity 4.1: Open the Dirty Dataset

⚙ Load and Review the File

1. In Excel, open **`customer_log_dirty.csv`** from the Student Files folder
2. Save it as **`customer-log-practice.xlsx`** (this converts it from CSV to an Excel file)
3. Scroll through the data without fixing anything yet: just observe what you see
4. The columns are: *Date*, *Customer_Name*, *City*, *State*, *Category*, *Quantity*, *Price*, *Total*
5. Click the small triangle in the very top-left corner of the grid (above row 1, left of column A) to select the entire worksheet
6. Double-click the divider between any two column header letters to auto-fit all column widths
7. Can you spot any problems on a quick scan?

Activity 4.2: Ask Gemini to Find the Problems

🔍 Let AI Do the Detective Work

1. Select all the data (**[Ctrl]** + **[A]**) and copy it (**[Ctrl]** + **[C]**)
2. In Gemini, click *New chat*, then type this prompt and press **[Shift]** + **[Enter]** for a new line:

I am going to paste a dataset from Excel. Please review it and identify all the data quality problems you can find: things like duplicate rows, inconsistent spellings, mixed formats, numbers stored as text, blank cells, or anything else that would cause problems in analysis.

3. Paste the data and send
4. Read Gemini's response carefully. It should identify several categories of problems.
5. Note which problems it found so you can fix them in the next activities

Activity 4.3: Investigate Specific Problems

Drill Down Into the Issues
Ask Gemini these targeted follow-up questions, one at a time:

1. *What are all the different values used in the State column? List each unique value.*
2. *Which rows appear to be duplicates? List their row numbers.*
3. *What are all the different spellings used for product categories in the Category column?*
4. *What are all the different spellings used in the City column? Are there any blank cities?*
5. *Are there any rows where Price or Total appears to be stored as text rather than a number? How can I tell?*

Activity 4.4: Fix the Problems in Excel

Apply the Corrections
Use Gemini's findings to make the following corrections in Excel:

1. **Standardize State values:**
   - Click `Home → Editing → Find & Select → Replace` (**[Ctrl]** + **[H]**)
   - Replace **`Arizona`** with **AZ**, then **`az`** with **AZ**, then **`Ariz.`** with **AZ**
   - Click ***Replace All*** for each, then close

2. **Standardize Category values:**
   - Use Find & Replace to correct each misspelling Gemini found
   - The variants in this file are **`Minerls`** → **`Minerals`**, **`Food items`** → **`Food Items`**, and **`clothing`** → **`Clothing`**
3. **Remove duplicate rows:**
   - Click anywhere in the data
   - Click `Data → Data Tools → Remove Duplicates`
   - Ensure all columns are checked and click ***OK***
   - Excel should report that it removed **5** duplicate values and **80** unique values remain
4. **Fix text-formatted numbers:**
   - Select the Price and Total columns
   - If cells show a small green triangle in the corner, click one, then click the warning icon and choose ***Convert to Number***
5. Save the workbook

Activity 4.5: Clean the City Names With a Formula

🪄 TRIM and PROPER Do the Tedious Work
The City column has lowercase names like `douglas`, mixed capitals like `Sierra vista`, and invisible extra spaces like `Tucson`. Fixing these one at a time is slow. A formula can fix them all at once.

1. Click cell **`I1`** and type **`City_Clean`**
2. Ask Gemini: *City names are in column C starting at C2. Some have extra spaces and inconsistent capitalization. What formula can I put in I2 to produce a cleaned-up version with the first letter of each word capitalized?*
3. Gemini should suggest something like `=PROPER(TRIM(C2))`. Ask it to explain what each part does if it does not say.
4. Enter the formula in **`I2`** and AutoFill it down the column. Check that `Sierra vista` became `Sierra Vista`.
5. Now replace the original cities with the clean ones. Select the cleaned

cells in column I and copy them (**[Ctrl]** + **[C]**).

6. Click **C2**, then click `Home → Clipboard → Paste` drop-down arrow and choose ***Values*** (the clipboard icon with `123`)
7. Delete column I. Because you pasted *values* rather than formulas, column C keeps the clean names.

Why paste values? If you pasted the formulas instead, they would point at themselves and break. Ask Gemini, *What is the difference between Paste and Paste Values in Excel?* if you want to know more.

Activity 4.6: Dates and Blanks: Judgment Calls

📅 Some Problems Need a Human Decision

1. Look at the Date column. Real dates line up on the **right** side of the cell. Text that only looks like a date lines up on the **left**. Do any dates look different from the others?
2. Ask Gemini: *My Date column in Excel has dates entered in several different styles. How do I make them all display the same way, such as 3/18/2025?*
3. Follow its advice. It will probably involve selecting the column and using `Home → Number → Number Format` drop-down arrow (or **[Ctrl]** + **[1]**) to choose a date format.
4. Now ask Gemini for a formula to count the blank cells in the City column (C2:C81). The answer should be **5**.
5. Ask Gemini: *Some customers have no city recorded. What should I do about those rows?*
6. Notice whether Gemini suggests guessing or "filling in" the missing cities. **Never let AI invent data.** The honest choices are to leave the cell blank, mark it `Unknown`, or look up the real answer. Type **`Unknown`** in each blank city cell.
7. Save the workbook

Activity 4.7: Verify the Cleaned Data

Confirm the Fixes Worked

1. Select all data and copy it again
2. Paste into Gemini with this prompt:

   I have cleaned the dataset based on your earlier feedback. Here is the updated data. Are there any remaining data quality problems?

3. Review Gemini's response: ideally it reports fewer or no remaining problems
4. Fix anything that was missed and save the workbook

Module 4 Checklist

1. Ask Gemini to list the data quality problems in a dataset
2. Use Find & Replace and Remove Duplicates to fix problems Gemini found
3. Use a TRIM and PROPER formula to clean a column, then Paste Values over the original
4. Recognize when a data problem needs a human decision rather than an AI fix

Module 5: Build Something New With AI

So far you have used Gemini to work with spreadsheets someone else built. In this module you will use Gemini as a design partner to build a brand new spreadsheet from a blank workbook. The example is a membership dues tracker for a small club, but the same steps work for a garden log, a travel budget, a reading list, or a volunteer schedule.

Activity 5.1: Plan the Spreadsheet

Ask Gemini to Design the Layout

1. In Gemini, click *New chat* and send this prompt:

   I am the volunteer treasurer for a small community club. Members pay $30 in annual dues, and some pay in installments. I want a simple Excel spreadsheet to track who has paid. Suggest the

columns I need, the formulas I should use, and anything else that would make it easy to use. Keep it simple; I am a beginner.

2. Read the suggestions. Gemini will likely suggest columns such as Member Name, Dues Owed, Amount Paid, Balance, and Status.
3. If the design seems too complicated, say so: *That is more than I need. Give me a version with no more than six columns.*
4. Keep this conversation open. You will use it for the rest of the module.

Activity 5.2: Generate Practice Data

⊞ Let Gemini Fill In Fictional Members

1. Ask Gemini: *Create 12 rows of fictional sample data for this tracker as a table. Use made-up names. Leave the Balance and Status columns empty so I can add formulas.*
2. In Excel, press **[Ctrl]** + **[N]** to create a new blank workbook and save it as **`club-dues`**
3. In Gemini, copy the table. Many tables have a copy icon in the corner; otherwise, drag across the table to select it and press **[Ctrl]** + **[C]**.
4. In Excel, click cell **A1** and press **[Ctrl]** + **[V]**
5. Check the pasted data. Did the numbers come in as real numbers (right-aligned) or as text (left-aligned)? If you see dollar signs stuck to numbers as text, you already know how to fix that from Module 4.
6. Auto-fit the column widths

Activity 5.3: Add the Formulas

🖩 Ask for Each Formula, Then Verify It

1. Tell Gemini which column letters your pasted table uses, for example: *In my sheet, Dues Owed is column B, Amount Paid is column C, Balance is column D, and Status is column E. Data starts in row 2.*
2. Ask for a Balance formula for **D2**, enter it, and verify it against the first row with mental math
3. Ask for a Status formula for **E2** that shows **Paid** when the balance is zero

and **Owes** otherwise. Enter and verify it.

4. AutoFill both formulas down to the last member
5. Ask Gemini for formulas to put two rows below your data that show the total dues collected and the number of members who still owe. Enter them and check them by counting by hand.
6. Save the workbook

Activity 5.4: Make It Easy and Hard to Break

Drop-Down Lists and Color Highlights
Two features make a tracker friendlier for whoever uses it next. Ask Gemini to teach you both.

1. Ask: *How do I add a drop-down list in Excel so a cell can only contain Cash, Check, or Online? It is for a new Payment Method column F.* Follow the steps to create the list. (Gemini should send you to `Data → Data Tools → Data Validation`.)
2. Click a cell in column F and use the drop-down arrow. Then try typing something not on the list, such as **`Venmo`**, and see what Excel does.
3. Ask: *How do I make the Status cell turn light red when it says Owes?* Follow the steps. (Gemini should send you to `Home → Styles → Conditional Formatting`.)
4. Change one member's Amount Paid to **`30`** and watch the Status and color update automatically
5. Save the workbook

Your Turn: Design Your Own

If you have time, start a new chat and ask Gemini to help you plan a spreadsheet for something in your own life. Some ideas:

- A travel budget that compares planned and actual spending
- A garden log that tracks planting dates and harvests
- A reading list with ratings and a count of books finished this year
- A volunteer sign-up schedule with a drop-down list of shifts

Use the same pattern: plan the layout, generate fictional practice data, add formulas one at a time, verify each one, and then add drop-down lists or color highlights. Remember the privacy rule: describe your real data, but do not paste anything sensitive.

Module 5 Checklist

1. Ask Gemini to design a spreadsheet layout and simplify it when needed
2. Paste an AI-generated table into Excel and check that the numbers are real numbers
3. Add and verify formulas for a brand new workbook
4. Add a drop-down list with Data Validation and a color highlight with Conditional Formatting

Looking Ahead: AI Built Into Excel

Throughout this class you have copied information back and forth between Excel and a browser. Microsoft also sells an AI assistant called **Copilot** that lives *inside* Excel and can read and change your workbook directly. The instructor will demonstrate it on a computer with a paid Microsoft 365 subscription.

Watch for These Points in the Demonstration

- Copilot works best when the data is formatted as an Excel **Table** (**[Ctrl]** + **[T]**)
- The Copilot pane has different modes. In **Chat** mode it only talks about the workbook; in **Edit** mode it actually writes formulas into the cells
- The prompts look just like the ones you wrote for Gemini today, and the same verify-and-iterate habit still applies
- Copilot in Excel requires a paid Microsoft 365 plan that includes it. The free Copilot website works like Gemini: you paste or upload, and it cannot change your file.

Everything you practiced today, including clear prompts, checking numbers, and protecting private data, carries over to whichever AI tool you use next.

Final Words

Congratulations on completing Excel with AI! You have used Gemini to write formulas, explain and repair them, analyze data, find problems in a messy dataset, and design a spreadsheet from scratch: tasks that used to require hours of manual work or advanced Excel knowledge. The key insight from today is not that AI replaces your skills, but that it amplifies them. The better you understand data and how Excel works, the better questions you can ask, and the better results you will get.

Questions Worth Asking

Any time you are working with data in Excel, consider asking Gemini:

- *What formula do I need to calculate [description]?*
- *Can you explain what this formula does: [paste formula]?*
- *This formula shows [error]. Why, and how do I fix it?*
- *Give me step-by-step instructions for [Excel feature].*
- *What data quality problems do you see in this data?*
- *What type of chart would best show [description]?*
- *I got [result]. Does that seem right based on the data?*

Appendix A: More Practice: Quarterly Performance Analysis

If you finish the main activities early or want to practice at home, use Gemini to analyze the quarterly performance dataset from the Student Files folder. Answers are provided so you can check both your work and Gemini's.

Activity 5.5: Formula Practice

1. Open **`quarterly_performance.xlsx`** from the Student Files folder and save it as **`quarterly-ai`**
2. Notice that the *Net_Profit* column is blank
3. Use Gemini to generate the Net Profit formula (Net Profit = Gross Profit minus Store Expenses)
4. Verify: the first row (2024 Q1 Jewelry) should be **$1,820**. Then AutoFill down the column.

5. Ask Gemini for an IF formula in column I that labels each row **Strong** if Net Profit is $3,000 or more and **Steady** otherwise
6. Ask Gemini for a **SUMIFS** formula (SUMIF with more than one condition) that totals Net Profit for the year 2025 only. The answer should be **$52,405**. For 2024, it should be **$47,480**.
7. Ask Gemini for a formula that calculates the percentage growth from 2024 to 2025. The answer should be about **10.4%**.
8. Save the workbook

Activity 5.6: Data Analysis Practice

Copy the completed quarterly data into Gemini (or upload the file) and ask:

- *Which product category was most profitable in 2025?* (Answer: Jewelry, $15,055)
- *Did any category show declining Net Profit from 2024 to 2025?* (Answer: No, all five grew)
- *What was the total Net Profit for the entire two-year period?* (Answer: $99,885)
- *Which quarter of 2025 had the highest total sales across all categories?* (Answer: Q4, $30,220)
- *Based on this data, what product category would you recommend the store invest more in? Why?* (No single right answer: judge whether the reasoning makes sense)

Activity 5.7: PivotTable and Chart Practice

1. Ask Gemini how to build a PivotTable with *Category* in Rows, *Year* in Columns, and the sum of *Net_Profit* in Values
2. Build it, then compare the numbers with Gemini's answers above
3. Ask Gemini what kind of chart would best compare 2024 and 2025 for each category, then build that chart in Excel

Appendix A Checklist

1. Generate a formula using Gemini with column and cell descriptions

2. Verify the formula before applying it to the full dataset
3. Use SUMIFS to total by year and calculate year-over-year growth
4. Paste quarterly data into Gemini and ask multi-year analysis questions
5. Ask Gemini for a recommendation and evaluate whether the reasoning makes sense

Appendix B: Excel Error Messages and What to Ask

When a cell shows one of these messages, paste the formula into Gemini along with the error. This table explains the usual cause so you know what to expect.

Error	What it usually means
`#####`	Not really an error. The column is too narrow to show the number. Widen the column.
`#DIV/0!`	The formula divided by zero or by an empty cell, or an AVERAGEIF found no matching rows (often a misspelling).
`#NAME?`	Excel does not recognize a word in the formula. Usually a misspelled function name or text missing its quotation marks.
`#VALUE!`	The formula tried to do math with text, such as a number stored as text or a cell containing a word.
`#REF!`	The formula points to a cell that no longer exists, usually because a row or column was deleted.
`#N/A`	A lookup formula could not find what it was looking for.

A prompt that works for all of them: *In Excel, this formula shows [error] instead of a result: [paste formula]. My data is in [describe columns]. What is wrong, and how do I fix it?*

Appendix C: Prompt Recipe Card

Keep this page next to your computer. Each recipe fills in the blanks for a common Excel task.

Write a Formula

My spreadsheet has these columns: [A=..., B=..., C=...]. Data starts in row [2]. What formula should I put in cell [X2] to [plain English description]? I plan to AutoFill it down to row [N].

Explain a Formula

Explain this Excel formula one piece at a time, as if I am a beginner: [paste formula]

Learn a Feature

Give me short, step-by-step instructions for [creating a PivotTable / adding a drop-down list / freezing the top row] in Excel [version, if you know it].

Analyze Data

Here is [description of data]. [Paste data.] Answer these questions: [list]. Show the numbers you used so I can check them.

Find Problems

Review this data and list every data quality problem you find: duplicates, inconsistent spellings, mixed formats, numbers stored as text, and blank cells. [Paste data.]

Design a Spreadsheet

I want a simple Excel spreadsheet to [purpose]. I am a beginner. Suggest no more than [six] columns, the formulas I need, and one feature that would prevent mistakes.