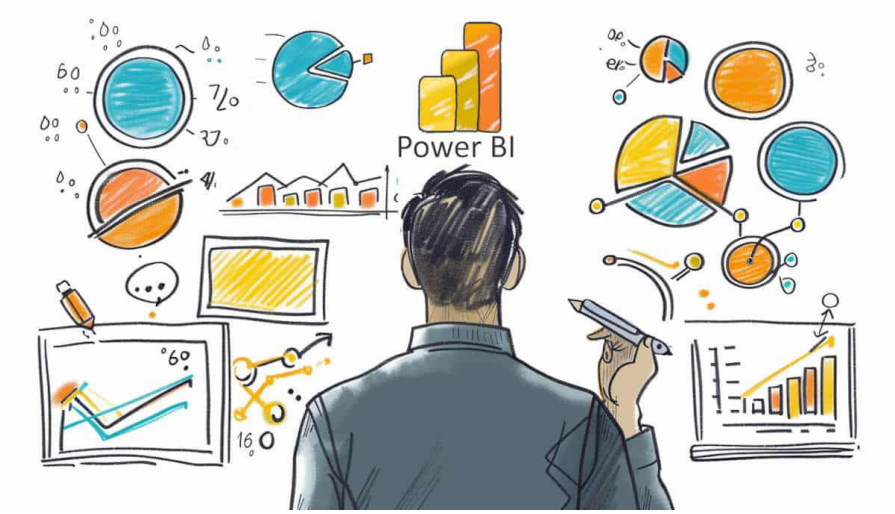

Power BI Desktop Tutorial: Sales Data Analysis

1) Load Data Files

Launch & Import

- Open **Power BI Desktop**
- **Home** → **Get data** → **Text/CSV**
- Select `Sales.csv` → Click **Open**
- In preview dialog: Click **Transform Data** (NOT Load)
- Repeat for `Products.csv` and `Customers.csv` using:
  - **Home** → **New Source** → **Text/CSV**
  - Recommended: Use **Transform Data** for all files

2) Clean & Transform Sales Data in Power Query

A. Promote Headers & Set Data Types

- **Home** → **Use First Row as Headers** (if needed)
- Set column data types explicitly:
  - `OrderID` → Whole Number
  - `OrderDate` → Date

- `Product` → Text
- `Quantity` → Whole Number
- `Price` → Decimal Number
- `City` → Text
- `CustomerID` → Text

*To change type: Click data type icon in header or **Transform** → **Data Type***

B. Clean Text Fields

- Select **Product** and **City** columns (Ctrl+click)
- **Transform** → **Format** → **Trim** (removes spaces)
- **Transform** → **Format** → **Clean** (removes non-printable characters)

C. Remove Bad Rows

- Filter `OrderID` dropdown → Uncheck (Blank)
- Filter `OrderDate` → Remove blanks/errors

D. Create TotalAmount Column

- **Add Column** → **Custom Column**
- **Name**: `TotalAmount`
- **Formula**: `=[Quantity] * [Price]`
- Set type to **Decimal Number**

E. Merge Products Table

- **Home** → **Merge Queries** → **Merge Queries as New**
- **First table**: Sales | **Second table**: Products
- Match on **Product** column in both tables
- **Join Kind**: Left Outer
- Expand new column → Select **Category** and **UnitCost**

- Uncheck "Use original column name as prefix"
- Set `UnitCost` type to **Decimal Number**

F. Create Profit Column

- **Add Column → Custom Column**
- **Name**: `Profit`
- **Formula**: `=[TotalAmount] - ([UnitCost] * [Quantity])`
- Set type to **Decimal Number**

G. Add Conditional Column

- **Add Column → Conditional Column**
- **Column name**: `OrderValueCategory`
- **Condition**:
  - If `TotalAmount > 500` then "High"
  - Else "Normal"

H. Finalize & Load

- Review **Applied Steps** in right pane
- **Home → Close & Apply**

3) Load Remaining Tables

- Ensure **Products** and **Customers** are loaded
- Right-click query → **Enable Load** (if set to Connection Only)

4) Create Date (Calendar) Table

Option A: DAX Method (Recommended)

- **Modeling** → **New table**
- Paste DAX code:

```dax
Date =
ADDCOLUMNS(
  CALENDAR(DATE(2023,1,1), DATE(2023,12,31)),
  "Year", YEAR([Date]),
  "MonthNumber", MONTH([Date]),
  "MonthName", FORMAT([Date], "MMMM"),
  "YearMonth", FORMAT([Date], "YYYY-MM"),
  "Quarter", "Q" & FORMAT([Date],"Q"),
  "Day", DAY([Date]),
  "IsWeekend", IF(WEEKDAY([Date],2) >= 6, TRUE(), FALSE()),
  "WeekOfYear", WEEKNUM([Date],2)
)
```

- **Table tools** → **Mark as date table** → Select **Date** column

Adjust CALENDAR dates if your data spans different years

5) Create Relationships

Model View Setup

- Click **Model** icon (left navigation)
- Create relationships by dragging:
  - `Products[Product]` → `Sales[Product]` (Many to One, Single)
  - `Customers[CustomerID]` → `Sales[CustomerID]` (Many to One, Single)
  - `Date[Date]` → `Sales[OrderDate]` (One to Many, Single)

Set Cross filter direction to Single unless specifically needed

6) Create DAX Measures

Essential Measures

```dax
Total Sales = SUM(Sales[TotalAmount])

Total Profit = SUM(Sales[Profit])

Avg Order Value =
DIVIDE([Total Sales], DISTINCTCOUNT(Sales[OrderID]), 0)

Sales YTD = TOTALYTD([Total Sales], 'Date'[Date])

Sales PY = CALCULATE([Total Sales], SAMEPERIODLASTYEAR('Date'[Date]))

Sales YoY % =
VAR PY = [Sales PY]
RETURN IF(ISBLANK(PY), BLANK(), DIVIDE([Total Sales] - PY, PY))
```

7) Build Report Visuals

A. Year Slicer

- **Visualizations → Slicer**
- Drag `Date[Year]` to slicer
- Format as **Dropdown** or **List**

B. Sales by Category (Bar Chart)

- **Visualizations → Clustered bar chart**
- **Axis:** `Products[Category]`
- **Values:** `[Total Sales]`
- **Format:** Enable title, data labels

C. Sales Trend (Line Chart)

- **Visualizations → Line chart**
- **Axis**: `Date[Date]` or `Date[YearMonth]`
- **Values**: `[Total Sales]`
- Enable drill-down for time hierarchy

D. Top 5 Products Table

- **Visualizations → Table**
- Add `Sales[Product]` and `[Total Sales]`
- **Filters → Top N**: Top 5 by `[Total Sales]`
- Optionally add `[Total Profit]`

8) Enhancements & Interactions

- Enable **drill-down** on time fields
- Customize **tooltips** by dragging fields to Tooltips pane
- Test filter interactions between visuals

9) Formatting & Polish

- Adjust visual titles, fonts, colors
- Enable **data labels** with appropriate units
- Set **page size** and layout
- Add **text box** for report title

10) Testing & Validation

- Test slicers and cross-filtering

- Verify totals with **Card** visuals
- Use **Data view** to inspect values
- Spot-check calculations manually

11) Save & Publish

- **File** → **Save** (e.g., `Sales_Sample.pbix`)
- **Home** → **Publish** → Select workspace
- Configure **scheduled refresh** in Power BI Service

12) Troubleshooting Tips

Common Issues & Solutions

- **Blank join results**: Trim and normalize text before merging
- **Date recognition**: Convert text to Date type in Power Query
- **Relationship issues**: Verify unique values on "one" side
- **Performance**: Remove unused columns, enable query folding
- **Filter ambiguity**: Avoid bi-directional relationships unless necessary

13) Code Snippets

Power Query M Code

```powerquery-m
let
    Source = Csv.Document(File.Contents("C:\Path\Sales.csv"),[Delimiter=",", Columns=7,
Encoding=65001, QuoteStyle=QuoteStyle.None]),
    #"Promoted Headers" = Table.PromoteHeaders(Source, [PromoteAllScalars=true]),
    #"Changed Types" = Table.TransformColumnTypes(#"Promoted Headers",{
```

```
        {"OrderID", Int64.Type}, {"OrderDate", type date}, {"Product", type text},
        {"Quantity", Int64.Type}, {"Price", type number}, {"City", type text}, {"Custom
erID", type text}
    }),
    #"Trimmed Text" = Table.TransformColumns(#"Changed Types", {{"Product", Text.Trim,
type text}, {"City", Text.Trim, type text}}),
    #"Added TotalAmount" = Table.AddColumn(#"Trimmed Text", "TotalAmount", each [Quanti
ty] * [Price], type number)
in
    #"Added TotalAmount"
```

Essential DAX Measures

```dax
Total Sales = SUM(Sales[TotalAmount])
Total Profit = SUM(Sales[Profit])
Avg Order Value = DIVIDE([Total Sales], DISTINCTCOUNT(Sales[OrderID]), 0)
Sales YTD = TOTALYTD([Total Sales], 'Date'[Date])
Sales PY = CALCULATE([Total Sales], SAMEPERIODLASTYEAR('Date'[Date]))
Sales YoY % =
VAR PY = [Sales PY]
RETURN IF(ISBLANK(PY), BLANK(), DIVIDE([Total Sales] - PY, PY))
```

This comprehensive guide covers end-to-end Power BI development from data loading to interactive reporting. Follow each section sequentially for best results.