1. Power Query Editor — data preparation (what to do and why)

Rename columns & change types

- Rename to consistent casing (e.g., Employment ID, Work Hours per Week) for readability and to avoid case-sensitivity surprises.
- Change types:
    - Hire_Date → Date
    - Monthly_Salary, Age, Years_at_company, Overtime_Hours, Training_Hours, Sick_Days, Team_Size, Promotions → Whole Number / Decimal Number as appropriate
    - Text fields remain Text.

Remove duplicates

- Remove duplicates on Employment_id to ensure each employee is unique.

Nulls handling

- Replace nulls for numeric KPIs with 0 only if that makes business sense (e.g., 0 training hours). For required fields like Employment_id or Hire_Date, remove row or flag for data quality review.

Calculated columns (Power Query M examples)

- Tenure Category (M):

= Table.AddColumn(#"PreviousStep", "Tenure Category", each if [Years_at_company] <= 2 then "New" else if [Years_at_company] <= 5 then "Mid" else "Veteran")

- Overtime Category (M):

= Table.AddColumn(#"PreviousStep", "Overtime Category", each if [Overtime_Hours] > 10 then "High" else "Low")

Date table

- Create a separate Date table (cover the range of Hire_Date), mark it as Date table, and connect DateTable[Date] → Employee_Performance[Hire_Date]. This enables time intelligence measures.

---

2. Data Model — relationships & best practices

- Use a star schema: central Employee_Performance fact table, lookup tables for Department, Job Title, Education_Level, Tenure Category, Date.
- Relationship: DateTable[Date] (1) -> Employee_Performance[Hire_Date] (many).

- Avoid bi-directional relationships unless necessary; prefer single-direction to avoid ambiguous filtering and circular dependencies.
- If you need filters across many lookups, use inactive relationships + USERELATIONSHIP in DAX for special cases rather than many-to-many bidirectional links.

---

3. DAX measures — key KPIs (examples)

Below are concise DAX measures you can paste into Power BI. Replace table/column names if different.

- **Employee Count**

Employee Count = DISTINCTCOUNT(Employee_Performance[Employment_id])

- **Resignation Rate** (percentage of employees who resigned at the selected time / filter)

Resigned Count = CALCULATE(COUNTROWS(Employee_Performance), Employee_Performance[Resigned] = "Yes")

Resignation Rate = DIVIDE([Resigned Count], [Employee Count], 0)

- **Avg. Performance Score**

Avg Performance Score = AVERAGE(Employee_Performance[Performance_Score])

- **Avg. Monthly Salary**

Avg Monthly Salary = AVERAGE(Employee_Performance[Monthly_Salary])

- **Avg. Training Hours**

Avg Training Hours = AVERAGE(Employee_Performance[Training_Hours])

- **Avg. Employee Satisfaction**

Avg Satisfaction = AVERAGE(Employee_Performance[Employee_Satisfaction_Score])

- **Overtime Utilization** (avg overtime hours per employee)

Avg Overtime Hours = AVERAGE(Employee_Performance[Overtime_Hours])

- **Sick Days per Employee**

Sick Days per Employee = AVERAGE(Employee_Performance[Sick_Days])

- **Remote Work Adoption Rate** (share of employees using remote work)

Remote Count = CALCULATE(COUNTROWS(Employee_Performance), Employee_Performance[Remote_Work_Frequency] <> "Never")

Remote Work Adoption Rate = DIVIDE([Remote Count], [Employee Count], 0)

- **Promotion Rate**

Promoted Count = CALCULATE(COUNTROWS(Employee_Performance), Employee_Performance[Promotions] > 0)

Promotion Rate = DIVIDE([Promoted Count], [Employee Count], 0)

- **Avg. Tenure**

Avg Tenure Years = AVERAGE(Employee_Performance[Years_at_company])

Notes

- Use DIVIDE(x,y,0) to avoid divide-by-zero errors.
- Add % formatting for rate measures and number formatting for salary.

---

4. Report pages & visuals — purpose and recommended visuals

I'll map each page to the visuals and give quick tips.

Page 1 — Executive Summary

- Cards: Employee Count, Resignation Rate (formatted %), Avg Performance Score, Avg Monthly Salary.
- Line Chart: Resignation Rate over Time — axis = DateTable[Date], values = measure Resignation Rate.
- Clustered Column: Department-wise Satisfaction — axis = Department, value = Avg Satisfaction.
- Tips: Add conditional formatting to cards (red/green) and a KPI trend sparkline in the card tooltips.

Page 2 — Department Insights

- Bar Chart: Employees per Department (count by department).
- Heatmap / Matrix: Avg Salary vs Performance per Department — use a matrix with conditional formatting on cells (salary on rows, performance on columns or vice versa).
- Pie/Donut: Education Level Distribution.
- KPI card: Avg Tenure by Department (use visual-level filters to show selected department).

Page 3 — Employee Engagement

- Gauge: Employee Satisfaction — use Avg Satisfaction with min/max benchmarks (e.g., 1–5).
- Donut Chart: Remote Work Frequency distribution.
- Clustered Column: Avg Overtime by Job Title.
- Scatter Plot: Training Hours (X) vs Performance Score (Y) with bubble size = Team_Size or Monthly_Salary.

Page 4 — Retention & Promotions

- Matrix: Promotions by Department & Education Level.
- Bar Chart: Sick Days vs Resigned Employees — e.g., average sick days for resigned vs active.
- Line Chart: Training Trend over Years — Date on X, Avg Training Hours on Y.
- Card: Promotion Rate.

Page 5 — Filters & Slicers

- Slicers: Department, Job Title, Education Level, Remote Work Frequency, Tenure Category, Resigned (Yes/No).
- Sync slicers across pages; include a Reset button with a bookmark.

Design tips

- Use grid layout, consistent color theme, company logo, readable fonts.
- Use icons for departments / job titles sparingly (for clarity).
- Add tooltips (custom tooltip pages) showing employee sample rows or definitions.

---

5. Power BI features to apply

- **DAX** for KPIs and time-intelligence (e.g., Year-to-Date resignation rate).
- **Custom tooltips**: create a tooltip report page with extra details for each visual.
- **Drillthrough pages**: allow drilling from summary to employee detail page (e.g., right-click → drillthrough to employee detail).
- **Bookmarks & Buttons**: for navigation and Reset filters experience.
- **Conditional formatting**: highlight poor/high performers.
- **Sync Slicers**: keep slicers consistent across pages.
- **Q&A visual**: enable natural language queries (train synonyms if needed).
- **Mobile view**: configure layout for phones.

---

6. Publishing, scheduled refresh & sharing

Publish process

1. Publish PBIX from Power BI Desktop to HR Analytics Workspace in Power BI Service.
2. Create App and distribute to stakeholders.

Scheduled refresh

- Configure dataset credentials in Power BI Service (gateway if on-premises).
- Set scheduled refresh frequency (daily or hourly depending on SLAs).
- Add Last Refresh card in the report using UTCNOW()/NOW() or the built-in LAST REFRESH from dataset metadata.

Permissions & RLS

- Assign roles (HR Team: view; Managers: department-limited). Use RLS for department managers (see next section).
- Use App workspace roles for publishing and deployment.

---

7. Row-Level Security (RLS) example

Scenario: department managers only see employees in their department.

Create a role DeptManager with DAX filter on Employee_Performance[Department]:

[Department] = LOOKUPVALUE(Managers[Department], Managers[UserPrincipalName], USERPRINCIPALNAME())

If you don't have a Managers table, a simpler hard-coded role:

Employee_Performance[Department] = "Sales"

Then assign users to the role in the Power BI Service. Prefer dynamic RLS using a Managers lookup table.

---

8. Optional advanced features

- **Paginated report**: for printable HR summaries (Power BI Report Builder).
- **Power Automate**: create flows to send alerts when Resignation Rate > threshold.
- **AI visuals / Insights**: use Key Influencers to find drivers of resignations or low satisfaction.

- **What-if parameters**: simulate pay increases or training investments and show projected effects.
- **Audit & lineage**: use data lineage in Service to track upstream sources.

---

9. Versioning & maintenance

- Keep PBIX backups (one per major version). Store in Git or SharePoint with version notes.
- Document changes (changelog) and data transformations in a README or the dataset description in Power BI Service.
- Monitor refresh failures via email alert; set up dataset refresh notifications.
- Monthly QC checks: null counts, duplicates, value ranges (e.g., salary min/max), and outlier detection.

---

10. Performance & modeling tips

- Prefer measures over calculated columns where possible.
- Reduce cardinality in columns used as slicers (group low-count job titles into "Other").
- Use native aggregations and avoid row-by-row iterators (e.g., minimize use of FILTER over entire table unless necessary).
- Import mode for most dashboards; use DirectQuery only if data freshness/size requires it.

---

11. Mobile view optimization

- Rearrange visuals using the Mobile Layout view in Power BI Desktop.
- Show only essential KPIs on mobile (cards + one small chart).
- Use larger fonts and single-column layout for touch.

---

12. Deliverables checklist (what to hand over)

- Final PBIX file with documented steps.
- Data dictionary (columns, data types, definitions).
- Changelog and refresh schedule.

- User guide (how to use filters, drillthrough, export).
- RLS mapping and list of workspace permissions.