



## Activity 1: “Command Quest: DDL vs. DML Showdown”

**Objective:** Help students differentiate between DDL and DML SQL commands and their real-world applications.

### How it works:

- Create a deck of **scenario cards**, each describing a database action (e.g., “*Add a new employee record*”, “*Delete all data from the Customer table*”, “*Rename a column in a table*”).
- Provide two labeled boards: **DDL (Structure)** and **DML (Data)**.
- In pairs or small teams, students:
  - **Sort the cards** into the correct category.
  - Match the action to the correct SQL command (e.g., CREATE, INSERT, UPDATE).
  - Present one card to the class and explain the decision.

**Bonus Round:** Include “Trick” cards to test critical thinking (e.g., “*Delete a row from a table*” vs. “*Drop the entire table*”).

**STEM Linkage:** This reinforces data management skills and schema literacy—essential for database admins and backend developers.

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## Activity 2: “Interface Explorer” (Hands-On Tool Simulation)

**Objective:** Explore different methods for accessing and interacting with databases.

### How it works:

- Set up mock **interfaces** at stations (or simulated tools on paper/digital slides):
  1. **Direct SQL input** (e.g., using Azure Data Studio)
  2. **Graphical query builder** (drag-and-drop interface)
  3. **Web application form** (programmatic interaction)
- Students rotate between stations, completing a mini-task at each:
  - Write a SQL query using DML (e.g., `SELECT * FROM Employees WHERE Department = 'IT';`)
  - Use visual cues to build the same query graphically.
  - Submit a form and analyze the underlying INSERT statement.



Student Engagement & Mentoring in Technology

**Debrief:** Discuss which method is best for different users (developer, analyst, end user) and how security differs between manual and automated methods.

**STEM Linkage:** Exposes students to real-world tools, supports differentiated learning styles, and emphasizes secure interaction with data systems.

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### Activity 3: “Export & Interact Challenge”

**Objective:** Practice data export strategies and understand programmatic database interactions.

**How it works:**

- Simulate a **data migration and backup** scenario.
- Provide each group with a mock dataset (e.g., a customer table).
- Students will:
  1. Decide which **export format** (CSV, JSON, SQL dump) is most appropriate for the scenario.
  2. Identify **backup frequency** based on data sensitivity.
  3. Write or simulate a **programmatic interaction** (e.g., how a web app might use INSERT to add user info).
- Then, groups will present:
  - Their strategy
  - Security concerns
  - Use cases for automation vs. manual interaction

**STEM Linkage:** Connects database theory to cybersecurity awareness and disaster recovery planning—key areas for future IT professionals.

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### Optional Integration:

Include a **cybersecurity extension** where students evaluate the **risk** of different interaction methods (e.g., SQL injection in programmatic inputs, dangers of DROP without proper access controls).