

# TOUCHPAD

Modular SQL (Ver. 2.0)



## TEACHER'S MANUAL

Extended Support for Teachers



[www.orangeeducation.in](http://www.orangeeducation.in)

| Teacher's Time Table |           | B R E A K |   |    |     |    |   |    |
|----------------------|-----------|-----------|---|----|-----|----|---|----|
| Periods / Days       |           |           |   |    |     |    |   |    |
|                      |           | 0         | I | II | III | IV | V | VI |
|                      | Monday    |           |   |    |     |    |   |    |
|                      | Tuesday   |           |   |    |     |    |   |    |
|                      | Wednesday |           |   |    |     |    |   |    |
|                      | Thursday  |           |   |    |     |    |   |    |
|                      | Friday    |           |   |    |     |    |   |    |
|                      | Saturday  |           |   |    |     |    |   |    |
|                      | Sunday    |           |   |    |     |    |   |    |

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# DEVELOPMENT MILESTONES IN A CHILD

Development milestones are a set of functional skills or age-specific tasks that most children can do at a certain age. These milestones help the teacher identify and understand how children differ in different age groups.



Age  
5 - 8 Years

## Physical

- First permanent tooth erupts
- Shows mature throwing and catching patterns
- Writing is now smaller and more readable
- Drawings are now more detailed, organised and have a sense of depth

## Cognitive

- Attention continues to improve, becomes more selective and adaptable
- Recall, scripted memory, and auto-biographical memory improves
- Counts on and counts down, engaging in simple addition and subtraction
- Thoughts are now more logical

## Language

- Vocabulary reaches about 10,000 words
- Vocabulary increases rapidly throughout middle childhood

## Emotional/ Social

- Ability to predict and interpret emotional reactions of others enhances
- Relies more on language to express empathy
- Self-conscious emotions of pride and guilt are governed by personal responsibility
- Attends to facial and situational cues in interpreting another's feelings
- Peer interaction is now more prosocial, and physical aggression declines

“ If you cannot do great things, do small things in a great way. ”

Age  
9 - 11 Years

### Physical

- Motor skills develop resulting in enhanced reflexes

### Cognitive

- Applies several memory strategies at once
- Cognitive self-regulation is now improved

### Language

- Ability to use complex grammatical constructions enhances
- Conversational strategies are now more refined

### Emotional/ Social

- Self-esteem tends to rise
- Peer groups emerge

Age  
11 - 20 Years

### Physical

- If a girl, reaches peak of growth spurt
- If a girl, motor performance gradually increases and then levels off
- If a boy, reaches peak and then completes growth spurt
- If a boy, motor performance increases dramatically

### Cognitive

- Is now more self-conscious and self-focused
- Becomes a better everyday planner and decision maker

### Emotional/ Social

- May show increased gender stereotyping of attitudes and behaviour
- May have a conventional moral orientation

Managing the children's learning needs according to their developmental milestones is the key to a successful teaching-learning transaction in the classroom.

“Family is the most important thing in the world.”

# TEACHING PEDAGOGIES



Pedagogy is often described as the approach to teaching. It is the study of teaching methods including the aims of education and the ways in which such goals can be achieved.

## Lesson Plans

A lesson plan is the instructor's road map which specifies what students need to learn and how it can be done effectively during the class time. A lesson plan helps teachers in the classroom by providing a detailed outline to follow in each class.

A lesson plan addresses and integrates three key components:

- Learning objectives
- Learning activities
- Assessment to check the student's understanding

A lesson plan provides an outline of the teaching goals:

### Before the class

1. Identify the learning objectives.
2. Plan the lesson in an engaging and meaningful manner.
3. Plan to assess student's understanding.
4. Plan for a lesson closure.

### During the class

Present the lesson plan.

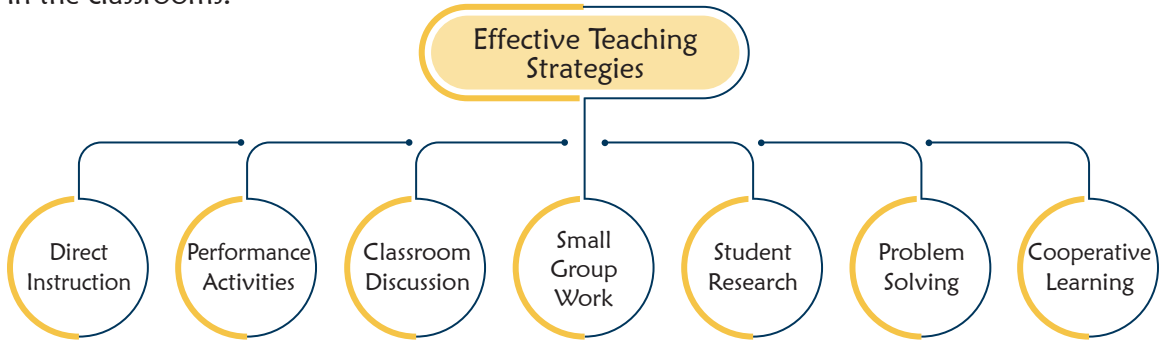
### After the class

Reflect on what worked well and why. If needed, revise the lesson plan.

“Knowing yourself is the beginning of all wisdom.”

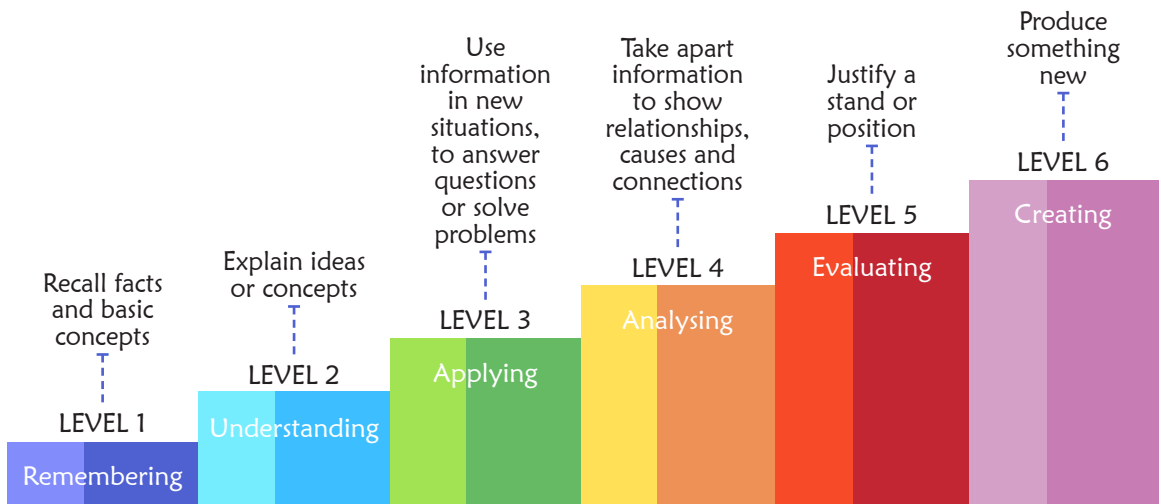
# Teaching Strategies

Numerous strategies have evolved over the years to facilitate the teaching-learning process in the classrooms.



## Bloom's Taxonomy

Bloom's Taxonomy was created by Dr Benjamin Bloom and several of his colleagues, to promote higher forms of thinking in education instead of rote learning. There are three domains of learning: cognitive (mental), affective (emotional), and psychomotor (physical). However, when we refer to Bloom's Taxonomy we speak of the cognitive domain. Bloom's Taxonomy is a list of cognitive skills that is used by teachers to determine the level of thinking their students have achieved. As a teacher, one should attempt to move students up the taxonomy as they progress in their knowledge.



Teachers should focus on helping students to remember information before expecting them to understand it, helping them understand it before expecting them to apply it to a new situation, and so on.

“ If you have no confidence in self,  
you are twice defeated in the race of life. ”

# LESSON PLAN

## 1 Introduction to DBMS

### Teaching Objectives

By the end of this lesson, students will be able to:

- ★ Understand the concept of database and DBMS.
- ★ Explain the limitations of file-based systems.
- ★ Describe relational databases and their structure.
- ★ Identify tables, fields, and records in a database.
- ★ Understand different types of keys (Primary, Foreign, Composite).
- ★ Explain SQL and its basic commands.
- ★ Differentiate between DDL, DML, DCL and TCL.
- ★ Recognise modern DBMS types like NoSQL and Cloud databases.

### Number of Periods

Theory

3

Practical

2

### Teaching Plan

#### Introduction (Engagement)

1. Ask students how schools, banks and hospitals store large amounts of information.
2. Compare a paper-based record system with a computerised database.
3. Introduce DBMS as a solution for organised and efficient data management.

### Lesson Delivery (Explanation & Demonstration)

#### 1. Understanding Database and DBMS

- Define database as an organised collection of data
- Explain DBMS as software used to store, manage and retrieve data
- Discuss functions: storage management, security, backup, multi-user access

#### 2. Database Servers

- Explain database servers as powerful systems that manage databases
- Describe operations like adding, accessing, modifying and deleting data quickly

#### 3. Relational Database

- Explain relational database structure using tables

- Describe how tables are linked using common fields
- Introduce RDBMS examples like MySQL, Oracle, SQL Server

### **Case Study Activity**

- Example: Employee, Salary and Attendance tables in an organisation
- Students identify how data is linked using Employee Code

### **4. Key Components of a Relational Database**

- Tables: Collection of rows and columns
- Fields: Attributes or columns of a table
- Records: Rows containing complete data entries
- Explain degree and cardinality in simple terms

### **5. Keys in Database**

- Primary Key: Unique identifier for records
- Composite Key: Combination of fields used for uniqueness
- Foreign Key: Links tables using primary key relationship

### **6. Understanding SQL**

- Define SQL as Structured Query Language
- Explain purpose: store, retrieve, update and delete data
- Introduce categories:
  - DDL (CREATE, ALTER, DROP)
  - DML (SELECT, INSERT, UPDATE, DELETE)
  - DCL (GRANT, REVOKE)
  - TCL (COMMIT, ROLLBACK, SAVEPOINT)

### **7. Modern DBMS**

- NoSQL databases for unstructured data
- Cloud databases offering scalability and remote access
- Comparison with traditional DBMS

### **Extension (Further Exploration)**

#### **Discussion Questions:**

- Why is DBMS better than file-based systems?
- Where is SQL used in real-life applications?
- How do cloud databases help modern applications?
- What risks can occur if database security is not maintained?

### **Suggested Activity**

Students work in groups to design a simple School Management Database. They identify tables, fields, records, primary and foreign keys, and classify SQL commands required to manage the database.

# Data Types and Operators in Python Introduction to MySQL

## Teaching Objectives

By the end of this lesson, students will be able to:

- ✦ Understand the purpose and features of MySQL and SQL.
- ✦ Install MySQL using the MySQL Installer.
- ✦ Identify common MySQL data types.
- ✦ Create databases and tables using SQL commands.
- ✦ Apply constraints such as NULL, NOT NULL, PRIMARY KEY, FOREIGN KEY, UNIQUE, DEFAULT and CHECK.
- ✦ Modify tables using ALTER TABLE commands.
- ✦ Delete tables using DROP TABLE.

| Number of Periods |           |
|-------------------|-----------|
| Theory            | Practical |
| 3                 | 2         |

## Teaching Plan

### Introduction (Engagement)

Strategy Used: Brainstorming and Think-Pair-Share

- Ask students what a database is and where they use databases in daily life (banking, school records, shopping websites).
- Show a spreadsheet and a database table to compare organised data.
- Introduce MySQL as an open-source RDBMS that uses SQL.

### Lesson Delivery (Explanation & Demonstration)

#### 1. Installing MySQL

- Explain MySQL, supported operating systems and demonstrate the installation process using MySQL Installer. Discuss the default root user and password setup.
- Activity: Students list the installation steps in sequence.

#### 2. Data Types in MySQL

- Explain INT, CHAR, VARCHAR, DECIMAL, DATE, FLOAT, TIME and TIMESTAMP with examples.
- Activity: Match suitable data types to different fields.

#### 3. Creating a Database and Table

- Demonstrate CREATE DATABASE, USE and CREATE TABLE syntax. Explain rows, columns and field sizes.
- Activity: Students create a School database and a Students table.

#### 4. Constraints

- Explain NULL, NOT NULL, PRIMARY KEY, FOREIGN KEY, Composite Primary Key, UNIQUE, DEFAULT and CHECK with examples.
- Case Study: Identify suitable constraints for a School Management System.

#### 5. Modifying a Table

- Demonstrate ALTER TABLE to add, modify and delete columns, add constraints and use DESC.
- Hands-on: Add an Address column and change its size.

#### 6. Deleting a Table

- Explain DROP TABLE command and when it should be used carefully.
- Discussion: Difference between deleting a table and deleting records.

#### Extension (Further Exploration)

- Why are constraints important in databases?
- Compare CHAR and VARCHAR with examples.
- Find two real-world applications that use MySQL.

#### Suggested Activity

Students work in pairs to design a database for a library or school. They identify tables, fields, data types and appropriate constraints, then write the CREATE TABLE statements.

## 3

## Handling Records In MYSQL

#### Teaching Objectives

By the end of this lesson, students will be able to:

- ✦ Insert records into MySQL tables using different forms of INSERT.
- ✦ Retrieve records using SELECT and WHERE clauses.
- ✦ Update and delete records using UPDATE and DELETE.
- ✦ Use DISTINCT clause to retrieve unique values.
- ✦ Understand and apply relational, Boolean and special operators.
- ✦ Write single-line and multi-line comments in SQL.

#### Teaching Plan

##### Introduction (Engagement)

- Ask students how schools or banks store and update information.

| Number of Periods |           |
|-------------------|-----------|
| Theory            | Practical |
| 2                 | 3         |

- Display a sample student table and ask how a new student can be added or an incorrect mark corrected.
- Introduce SQL commands used to handle records in MySQL.

### Lesson Delivery (Explanation & Demonstration)

#### 1. **Inserting Records**

- Explain INSERT INTO statement, single, multiple and selective column insertion.
- Activity: Students insert records into a Students table.

#### 2. **Retrieving Records**

- Explain SELECT, selecting all columns, specific columns, WHERE clause and calculated columns.
- Activity: Retrieve students scoring above a given mark.

#### 3. **Updating and Deleting Records**

- Demonstrate UPDATE and DELETE with and without WHERE clause. Explain importance of WHERE.
- Case Study: Correct a student's marks and delete an obsolete record.

#### 4. **DISTINCT Clause**

- Explain DISTINCT with duplicate values.
- Hands-on: Retrieve unique product names from an Orders table.

#### 5. **SQL Operators**

- Explain relational, Boolean (AND, OR, NOT) and special operators (ALL, ANY, BETWEEN, EXISTS, IN, LIKE) with examples.
- Activity: Write queries using each operator.

#### 6. **MySQL Comments**

- Explain single-line and multi-line comments and their purpose.
- Activity: Add comments to SQL programs.

### Extension (Further Exploration)

#### **Discussion Questions:**

- Why should UPDATE and DELETE normally be used with a WHERE clause?
- Compare DISTINCT and WHERE with suitable examples.
- Find two real-world applications where SQL queries are used.

### Suggested Activity

Students work in groups to create a Library or Store database. They insert sample records, retrieve filtered information, update incorrect data, remove unwanted records and present the SQL commands used.



### Teaching Objectives

By the end of this lesson, students will be able to:

- ✦ Understand the concept and use of aliases in MySQL.
- ✦ Perform calculations using aggregate functions.
- ✦ Use GROUP BY and HAVING clauses effectively.
- ✦ Sort query results using ORDER BY.
- ✦ Apply common string, numeric, and date/time functions in MySQL.
- ✦ Write SQL queries using functions for real-life data analysis.

| Number of Periods |           |
|-------------------|-----------|
| Theory            | Practical |
| 2                 | 3         |

### Teaching Plan

#### Introduction (Engagement)

- Ask students why short names and organised reports are useful while working with large databases.
- Display a student table and ask how to find the highest marks, average marks or sort names alphabetically.
- Introduce advanced MySQL queries used for analysing and presenting data.

### Lesson Delivery (Explanation & Demonstration)

#### 1. Aliasing

- Explain column and table aliases using AS. Demonstrate temporary names for columns and tables.
- Activity: Rename columns and tables in sample queries.

#### 2. Performing Calculations in Queries

- Explain aggregate functions COUNT(), AVG(), MAX(), MIN() and SUM() with examples. Discuss how NULL values are ignored.
- Activity: Find total, average and highest marks from a Students table.

#### 3. GROUP BY and HAVING

- Demonstrate grouping records and filtering grouped results using HAVING.
- Case Study: Calculate subject-wise student count and total marks.

#### 4. ORDER BY

- Explain sorting data in ascending and descending order using single and multiple columns.
- Hands-on: Sort students by name, age and date of birth.

#### 5. MySQL Functions

- Explain String functions (CHAR, CONCAT, LOWER, UPPER), Numeric functions (MOD, POWER, SIGN, SQRT, TRUNCATE) and Date/Time functions (CURDATE, DATE, MONTH, YEAR, NOW).

- Activity: Write SQL queries using each category of functions.

### Extension (Further Exploration)

- Why are aliases useful in SQL queries?
- Compare WHERE and HAVING with suitable examples.
- Identify three real-life situations where aggregate functions are useful.

### Suggested Activity

Students work in groups to analyse a School database. They calculate averages, totals and maximum values, group records by class or subject, sort results, and present their SQL queries with appropriate aliases and functions.

## 5 Advanced Features of MYSQL

### Teaching Objectives

By the end of this lesson, students will be able to:

- ✦ Understand subqueries and their use in SQL.
- ✦ Differentiate between various types of joins and apply them in queries.
- ✦ Create, update and manage views in MySQL.
- ✦ Understand the purpose and advantages of indexes.
- ✦ Write advanced SQL queries using subqueries, joins and views.

### Teaching Plan

| Number of Periods |           |
|-------------------|-----------|
| Theory            | Practical |
| 2                 | 3         |

### Introduction (Engagement)

- Ask students how information from multiple tables can be combined to answer a real-life question.
- Display two related tables such as Students and Fees and ask how complete information can be retrieved.
- Introduce advanced MySQL features used in professional database applications.

### Lesson Delivery (Explanation & Demonstration)

#### 1. Subqueries

- Explain the concept of a query within another query, rules of subqueries and the use of comparison operators. Demonstrate nested queries using aggregate functions.
- Activity: Retrieve students with the minimum age and products having quantity above a given value.

#### 2. Joins

- Explain Cartesian Product, Equi Join, Natural Join, Inner Join, Left Join and Right Join with suitable examples. Compare the output of each join.

- Activity: Combine Students and Fees tables to generate meaningful reports.

### 3. Views

- Explain virtual tables, CREATE VIEW, updating, replacing, inserting into and deleting views, DROP VIEW and WITH CHECK OPTION.
- Case Study: Create a PRODUCT\_SALES view and modify its data.

### 4. Index

- Explain the purpose of indexes, advantages of faster data retrieval and situations where indexes are useful.
- Hands-on: Identify columns suitable for indexing in a School database.

### 5. Practical SQL Applications

- Demonstrate writing complex SQL queries using subqueries, joins, views and indexes for real-world database problems.

### Extension (Further Exploration)

- Compare different types of joins with examples.
- Why are views useful in database security?
- Identify real-life applications where indexes improve database performance.

### Evaluation (Assessments & Review)

- MCQs and Fill-in-the-blanks from textbook exercises.
- Short answer questions on syntax and definition.
- **Lab Activity:** Implement all three types of user-defined functions.
- **Project:** Build a simple calculator using user-defined functions.

### Suggested Activity

Students work in groups to design a School Management Database using multiple related tables. They create joins, build a view for reports, use a subquery to answer a problem, and identify fields that should be indexed for faster searching.