

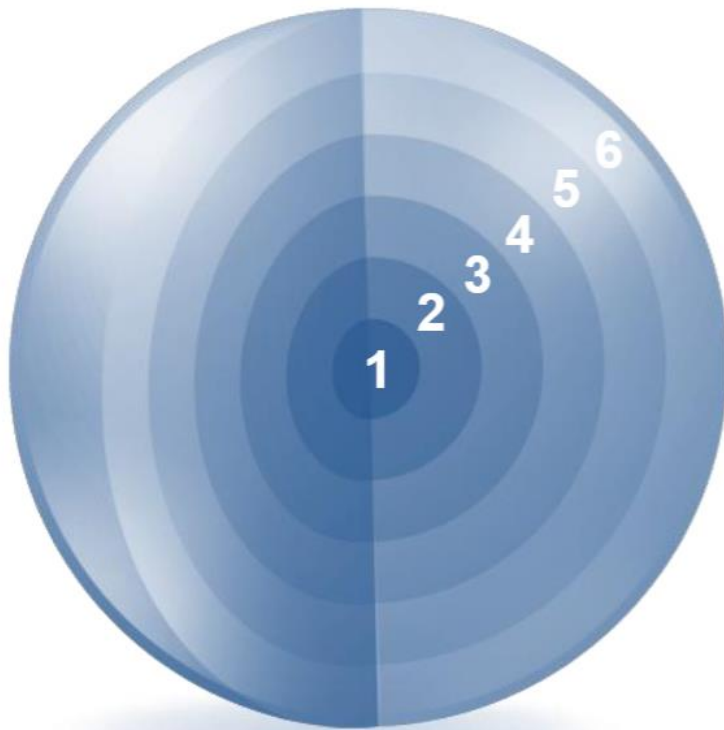
Lesson 10

Using DDL Statements to Create and Manage Tables

Activate Windows
Go to Settings to activate Windows.

ORACLE

Session Summary



1. Categorize the main database objects
2. Review the table structure
3. List the data types that are available for columns
4. Create a simple table
5. Explain how constraints are created at the time of table creation
6. Describe how schema objects work

Activate Windows
Go to Settings to activate Windows.

ORACLE

Database Objects

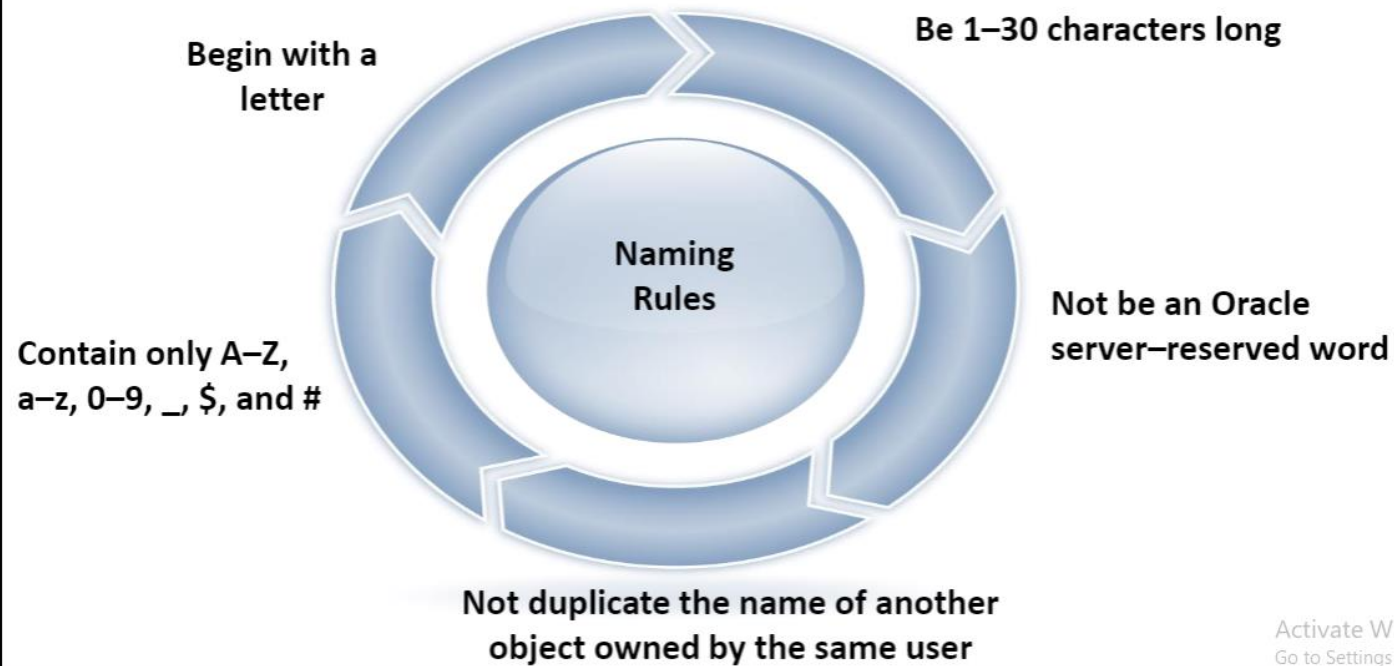
Object	Description
Table	Basic unit of storage; composed of rows
View	Logically represents subsets of data from one or more tables
Sequence	Generates numeric values
Index	Improves the performance of some queries
Synonym	Gives alternative name to an object

Activate Windows
Go to Settings to activate Windows.

ORACLE

Naming Rules

Table names and column names must:



Activate Windows
Go to Settings to activate Windows.

ORACLE

CREATE TABLE Statement

- You must have:
 - The CREATE TABLE privilege
 - A storage area

```
CREATE TABLE [schema.] table  
      (column datatype [DEFAULT expr][, ...]);
```

- You specify:
 - The table name
 - The column name, column data type, and column size

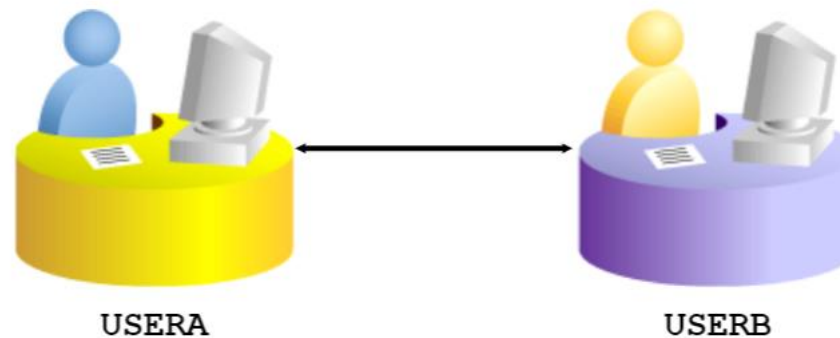


Activate Windows
Go to Settings to activate Windows.

ORACLE

Referencing Another User's Tables

- Tables belonging to other users are not in the user's schema.
- You should use the owner's name as a prefix to those tables.



`SELECT *`
`FROM userB.employees;`

`SELECT *`
`FROM userA.employees;`

Activate Windows
Go to Settings to activate Windows.

ORACLE

DEFAULT Option

- Specify a default value for a column during an insert.

```
... hire_date DATE DEFAULT SYSDATE, ...
```

- Literal values, expressions, or SQL functions are legal values.
- Another column's name or a pseudocolumn are illegal values.
- The default data type must match the column data type.

```
CREATE TABLE hire_dates  
  (id          NUMBER(8),  
   hire_date DATE DEFAULT SYSDATE);
```

```
CREATE TABLE succeeded.
```

Activate Windows
Go to Settings to activate Windows.

ORACLE

Creating Tables

- Create the table:

```
CREATE TABLE ord  
  ( ID NUMBER (3),  
    quantity NUMBER (3),  
    ord_date DATE DEFAULT SYSDATE);
```

CREATE TABLE succeeded.

- Confirm table creation:

```
DESCRIBE ord ;
```

Name	Null	Type
-----	----	-----
ID		NUMBER(3)
QUANTITY		NUMBER(3)
ORD_DATE		DATE

Activate Windows
Go to Settings to activate Windows.

ORACLE

Data Types

Data Type	Description
VARCHAR2 (<i>size</i>)	Variable-length character data
CHAR (<i>size</i>)	Fixed-length character data
NUMBER (<i>p</i> , <i>s</i>)	Variable-length numeric data
DATE	Date and time values
LONG	Variable-length character data (up to 2 GB)
CLOB	Character data (up to 4 GB)
RAW and LONG RAW	Raw binary data
BLOB	Binary data (up to 4 GB)
BFILE	Binary data stored in an external file (up to 4 GB)
ROWID	A base-64 number system representing the unique address of a row in its table

Activate Windows
Go to Settings to activate Windows.

ORACLE

Datetime Data Types

You can use several datetime data types:

Data Type	Description
TIMESTAMP	Date with fractional seconds
INTERVAL YEAR TO MONTH	Stored as an interval of years and months
INTERVAL DAY TO SECOND	Stored as an interval of days, hours, minutes, and seconds

Activate Windows
Go to Settings to activate Windows.

ORACLE

Constraints enforce rules at the table level.

Constraints prevent the deletion of a table if there are dependencies.

The following constraint types are valid:

NOT NULL
UNIQUE
PRIMARY KEY
FOREIGN KEY
CHECK

Activate Windows
Go to Settings to activate Windows.

ORACLE

Constraint Guidelines

You can name a constraint, or the Oracle server generates a name by using the SYS_Cn format.

Create a constraint at either of the following times:

- At the same time as the creation of the table
- After the creation of the table

Define a constraint at the column or table level.

View a constraint in the data dictionary.

Activate Windows
Go to Settings to activate Windows.

ORACLE

Defining Constraints

- Syntax:

```
CREATE TABLE [schema.] table
  (column datatype [DEFAULT expr]
   [column_constraint],
   ...
   [table_constraint] [, ...]);
```

- Column-level constraint syntax:

```
column [CONSTRAINT constraint_name] constraint_type,
```

- Table-level constraint syntax:

```
column, ...
  [CONSTRAINT constraint_name] constraint_type
  (column, ...),
```

Activate Windows
Go to Settings to activate Windows.

ORACLE

NOT NULL Constraint Orders table

	ORDER_ID	ORDER_DATE	ORDER_MODE	CUSTOMER_ID	ORDER_STATUS	ORDER_TOTAL	SALES_REP_ID	PROMOTION_ID
1	2458	20-NOV-99 04.11.54.696211000	AM direct	102	0	70647.34	153	(null)
2	2397	20-NOV-99 04.11.54.696211000	AM direct	102	1	42283.2	154	(null)
3	2454	03-OCT-99 05.19.34.678340000	AM direct	103	1	6653.4	154	(null)
4	2354	15-JUL-00 05.48.23.234567000	AM direct	104	0	46257	155	(null)
5	2358	09-JAN-00 06.33.12.654278000	AM direct	105	2	7826	155	(null)
6	2381	15-MAY-00 08.29.08.843679000	AM direct	106	3	23034.6	156	(null)
7	2440	01-SEP-99 09.23.06.008765000	AM direct	107	3	63695.66	156	(null)
8	2357	09-JAN-98 09.49.44.123456000	AM direct	108	5	59872.4	158	(null)
9	2394	11-FEB-00 10.52.35.564789000	AM direct	109	5	21863	158	(null)
10	2435	03-SEP-99 10.52.53.134567000	AM direct	144	6	62303	159	(null)
11	2455	20-SEP-99 11.04.11.456789000	PM direct	145	7	14087.5	160	(null)
12	2379	16-MAY-99 01.52.24.234567000	PM direct	146	8	17848.2	161	(null)
13	2396	02-FEB-98 03.04.56.345678000	PM direct	147	8	34930	161	(null)
14	2434	13-SEP-99 05.19.30.647893000	PM direct	149	8	242458.25	161	(null)
15	2436	02-SEP-99 05.48.04.378034000	PM direct	116	8	6394.8	161	(null)
16	2446	27-JUL-99 06.33.08.302945000	PM direct	117	8	93570.57	161	(null)
17	2447	27-JUL-00 08.29.10.223344000	PM direct	101	8	33893.6	161	(null)
18	2432	14-SEP-99 09.23.40.223345000	PM direct	102	10	10523	163	(null)
19	2355	26-JAN-98 10.52.51.962632000	PM online	104	8	94513.5	(null)	(null)
20	2356	26-JAN-00 10.52.41.934562000	PM online	105	5	29473.8	(null)	(null)

↑
NOT NULL constraint
(Primary Key enforces
NOT NULL constraint.)

↑
NOT NULL
constraint

↑
Absence of NOT NULL constraint
(Any row can contain a null
value for this column.)

Activate Windows
Go to Settings to activate Windows.

ORACLE

UNIQUE Constraint

EMPLOYEES  **UNIQUE constraint**

	EMPLOYEE_ID	LAST_NAME	EMAIL
1	100	King	SKING
2	101	Kochhar	NKOCHHAR
3	102	De Haan	LDEHAAN
4	103	Hunold	AHUNOLD
5	104	Ernst	BERNST
6	107	Lorentz	DLORENTZ

...



INSERT INTO

208 SMITH	JSMITH
-----------	--------

← **Allowed**

209 SMITH	JSMITH
-----------	--------

← **Not allowed: already exists**

Activate Windows
Go to Settings to activate Windows.

ORACLE

UNIQUE Constraint

Defined at either the table level or the column level:

```
CREATE TABLE orders(  
    order_id          NUMBER(4) ,  
    order_mode        VARCHAR2(25) NOT NULL ,  
    order_status       CHAR(2) ,  
    customer_id        NUMBER(8,2) ,  
    order_date         DATE NOT NULL ,  
    ...  
    CONSTRAINT ord_id_uk UNIQUE(order_id) );
```

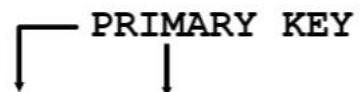
Activate Windows
Go to Settings to activate Windows.

ORACLE

PRIMARY KEY Constraint

ORDER_ITEMS

PRIMARY KEY



	ORDER_ID	LINE_ITEM_ID	PRODUCT_ID	UNIT_PRICE	QUANTITY
1	2355	1	2289	46	200
2	2356	1	2264	199.1	38
3	2357	1	2211	3.3	140
4	2358	1	1781	226.6	9
5	2359	1	2337	270.6	1
6	2361	1	2289	46	180
7	2362	1	2289	48	200
8	2363	1	2264	199.1	9
9	2364	1	1910	14	6
10	2365	1	2289	48	92

Activate Windows
Go to Settings to activate Windows.

ORACLE

FOREIGN KEY Constraint

INVENTORIES TABLE

**PRIMARY
KEY**



PRODUCT_ID	WAREHOUSE_ID	QUANTITY_ON_HAND
3108	8	122
3110	8	123
3112	8	123
3117	8	124
3124	8	125

...

ORDER_ITEMS TABLE

**FOREIGN
KEY**

	ORDER_ID	LINE_ITEM_ID	PRODUCT_ID
1	2355	1	2289
2	2356	1	2264
3	2357	1	2211
4	2358	1	1781
5	2359	1	2337

...

Activate Windows
Go to Settings to activate Windows.

ORACLE

FOREIGN KEY Constraint

Defined at either the table level or the column level:

```
CREATE TABLE orders(  
    order_id          NUMBER(4) ,  
    order_mode        VARCHAR2(25) NOT NULL,  
    order_status       CHAR(2) ,  
    customer_id        NUMBER(8,2) ,  
    order_date         DATE NOT NULL,  
    ...  
  
    CONSTRAINT ord_inv_fk FOREIGN KEY (order_id)  
        REFERENCES inventories(order_id)) ;
```

Activate Windows
Go to Settings to activate Windows.

ORACLE

FOREIGN KEY Constraint: Keywords

FOREIGN KEY: Defines the column in the child table at the table-constraint level

REFERENCES: Identifies the table and column in the parent table

ON DELETE CASCADE:

Deletes the dependent rows in the child table when a row in the parent table is deleted

ON DELETE SET NULL:

Converts dependent foreign key values to null

Activate Windows
Go to Settings to activate Windows.

ORACLE

CHECK Constraint

Defines a condition that each row must satisfy

The following expressions are not allowed:

- References to CURRVAL, NEXTVAL, LEVEL, and ROWNUM pseudo columns
- Calls to SYSDATE, UID, USER, and USERENV functions
- Queries that refer to other values in other rows

```
..., order_status NUMBER(2)  
    CONSTRAINT ord_status_btw  
    CHECK (order_status BETWEEN 0 AND 10),...
```

Activate Windows
Go to Settings to activate Windows.

ORACLE

CREATE TABLE: Example

```
CREATE TABLE customers

( customer_id          NUMBER(6)
, cust_first_name      VARCHAR2(20)
  CONSTRAINT cust_fname_nn NOT NULL
, cust_last_name       VARCHAR2(20)
  CONSTRAINT cust_lname_nn NOT NULL
, cust_address         cust_address_typ
, phone_numbers        phone_list_typ
, nls_language         VARCHAR2(3)
, nls_territory        VARCHAR2(30)
, credit_limit         NUMBER(9,2)
, cust_email           VARCHAR2(30)
, account_mgr_id       NUMBER(6)
,      CONSTRAINT      customer_credit_limit_max
                        CHECK (credit_limit <= 5000)
,      CONSTRAINT      customer_id_min
                        CHECK (customer_id > 0)
) ;
```

Activate Windows
Go to Settings to activate Windows.

ORACLE

Violating Constraints

```
UPDATE employees  
SET   department_id = 55  
WHERE department_id = 110;
```

Error starting at line 1 in command:

```
UPDATE employees  
SET   department_id = 55  
WHERE department_id = 110
```

Error report:

```
SQL Error: ORA-02291: integrity constraint (ORA1.EMP_DEPT_FK) violated - parent key not found  
02291. 00000 - "integrity constraint (%s.%s) violated - parent key not found"  
*Cause:      A foreign key value has no matching primary key value.
```

Department 55 does not exist.

Activate Windows
Go to Settings to activate Windows.

ORACLE

Violating Constraints

You cannot delete a row that contains a primary key that is used as a foreign key in another table.

```
DELETE FROM departments
WHERE department_id = 60;
```

```
Error starting at line 1 in command:
DELETE FROM departments
WHERE department_id = 60
```

Error report:

```
SQL Error: ORA-02292: integrity constraint (ORA1.JHIST_DEPT_FK) violated - child record found
02292. 00000 - "integrity constraint (%s.%s) violated - child record found"
```

```
*Cause:      attempted to delete a parent key value that had a foreign
              dependency.
```

```
*Action:     delete dependencies first then parent or disable constraint.
```

Activate Windows
Go to Settings to activate Windows.

ORACLE

Creating a Table Using a Subquery

- Create a table and insert rows by combining the CREATE TABLE statement and the AS *subquery* option.

```
CREATE TABLE table  
            [(column, column...)]  
AS subquery;
```

- Match the number of specified columns to the number of subquery columns.
- Define columns with column names and default values.

Activate Windows
Go to Settings to activate Windows.

ORACLE

Creating a Table Using a Subquery

```
CREATE TABLE ord2458
AS
  SELECT order_id , order_date ,
         order_status ,
         customer_id
  FROM orders
 WHERE order_id = 2458 ;
```

CREATE TABLE succeeded.

```
DESCRIBE ord2458 ;
```

Name	Null	Type
ORDER_ID		NUMBER(12)
ORDER_DATE	NOT NULL	TIMESTAMP(6) WITH LOCAL TIME ZONE
ORDER_STATUS		NUMBER(2)
CUSTOMER ID	NOT NULL	NUMBER(6)

Activate Windows
Go to Settings to activate Windows.

ORACLE

Dropping a Table

Moves a table to the recycle bin

Removes the table and all its data entirely if the PURGE clause is specified

Invalidates dependent objects and removes object privileges on the table

```
DROP TABLE ord2458;
```

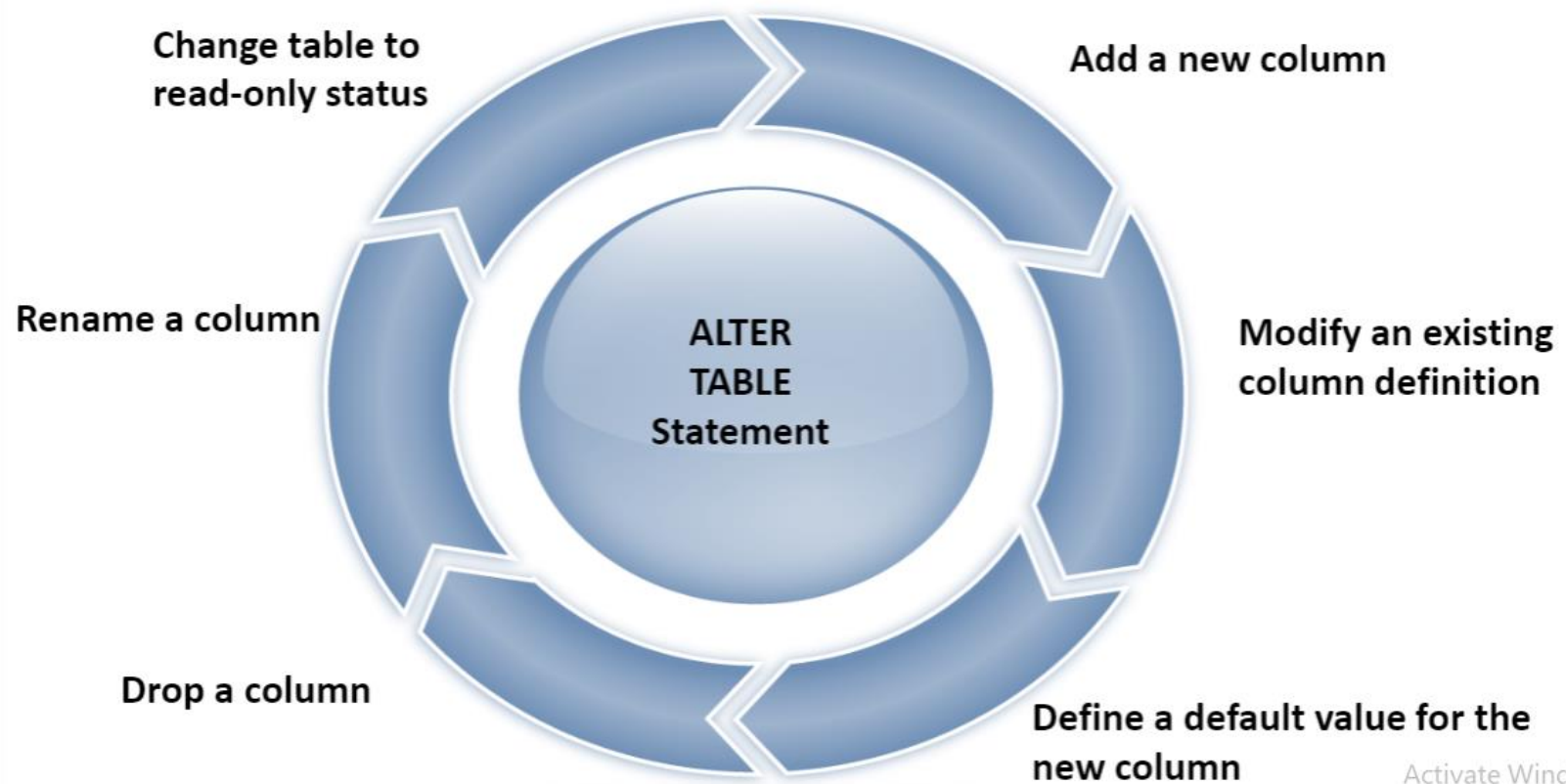
```
DROP TABLE dept80 succeeded.
```

Activate Windows
Go to Settings to activate Windows.

ORACLE

ALTER TABLE Statement

Use the ALTER TABLE statement to:



Activate Windows
Go to Settings to activate Windows.

ORACLE

Read-Only Tables

Put a table into read-only mode, which prevents DDL or DML changes during table maintenance

Put the table back into read/write mode

```
ALTER TABLE orders READ ONLY ;
```

```
-- perform table maintenance and then  
-- return table back to read/write mode
```

```
ALTER TABLE orders READ WRITE ;
```

Activate Windows
Go to Settings to activate Windows.

ORACLE

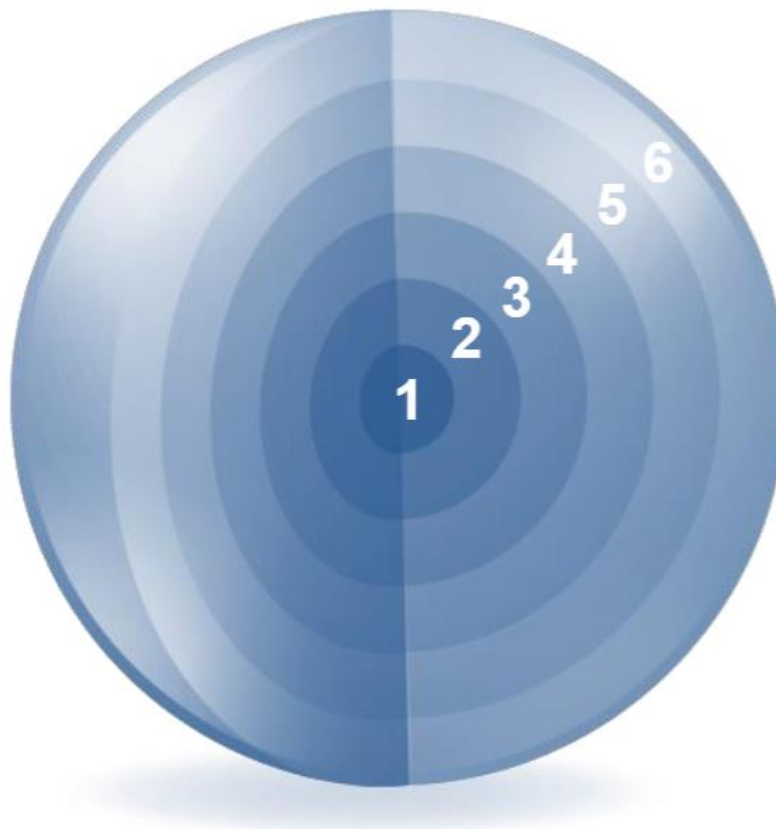
You can use constraints to do the following:

- 1.Enforce rules on the data in a table whenever a row is inserted, updated, or deleted.**
- 2.Prevent the deletion of a table.**
- 3.Prevent the creation of a table.**
- 4.Prevent the creation of data in a table.**

Activate Windows
Go to Settings to activate Windows.

ORACLE

Session Summary



1. Categorize the main database objects

2. Review the table structure

3. List the data types that are available for columns

4. Create a simple table

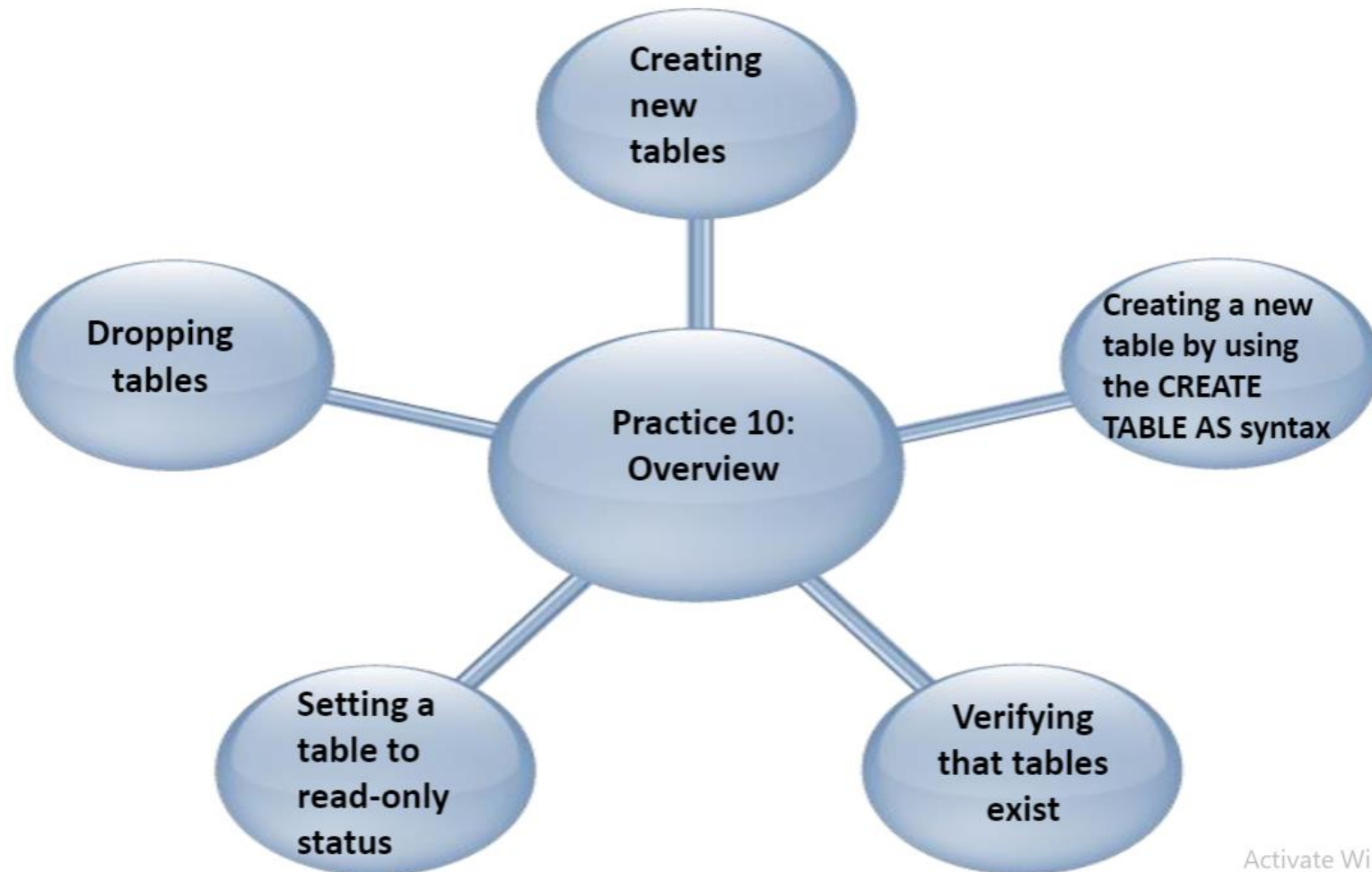
5. Explain how constraints are created at the time of table creation

6. Describe how schema objects work

Activate Windows
Go to Settings to activate Windows.

ORACLE

Practice 10: Overview



Activate Windows
Go to Settings to activate Windows.

ORACLE