SQL CODE TO ANSWER questions:

1. Create a **View** called **"forestation"** by joining all three tables - **forest_area, land_area** and **regions** in the workspace.
2. The **forest_area** and **land_area** tables *join* on both **country_code** AND **year**.
3. The **regions** table joins these based on only **country_code**.
4. In the 'forestation' View, include the following:
    - **All of the columns of the origin tables**
    - A **new column** that provides the **percent of the land area that is designated as forest**.
5. *Keep in mind* that the column **forest_area_sqkm** in the forest_area table and the **land_area_sqmi** in the land_area table are in **different units (square kilometers and square miles, respectively)**, so an adjustment will need to be made in the calculation you write (1 sq mi = 2.59 sq km).

Code:

```
CREATE VIEW forestation

AS

SELECT f.country_code country_code,f.country_name country_name, f.year curr_year,
f.forest_area_sqkm forest_area_sqkm, l.total_area_sq_mi total_area_sq_mi,r.region
region,r.income_group income_group,((forest_area_sqkm/(total_area_sq_mi * 2.59))* 100) AS percent

FROM forest_area f

JOIN land_area l

ON (f.year = l.year) AND (l.country_code = f.country_code)

JOIN regions r

ON (r.country_code = f.country_code) AND (r.country_code = l.country_code);
```

GLOBAL SITUATION

a. What was the total forest area (in sq km) of the world in 1990? Please keep in mind that you can use the country record denoted as "World" in the region table.

Code:

```
SELECT SUM(forest_area_sqkm) total
FROM forestation
WHERE region = 'World' AND curr_year = 1990
```

b. What was the total forest area (in sq km) of the world in 2016? Please keep in mind that you can use the country record in the table is denoted as "World."

Code:

```
SELECT SUM(forest_area_sqkm) total
FROM forestation
WHERE region = 'World' AND curr_year = 2016
```

c. What was the change (in sq km) in the forest area of the world from 1990 to 2016?

Code:

```
WITH t1 AS (SELECT region, curr_year, SUM(forest_area_sqkm) total
                    FROM forestation
                    GROUP BY 1,2
                    HAVING region = 'World' AND curr_year = 2016),

t2 AS (SELECT region, curr_year, SUM(forest_area_sqkm) total
                FROM forestation
                GROUP BY 1,2
                HAVING region = 'World' AND curr_year = 1990)
 SELECT (t1.total - t2.total) change
 FROM t1
```

```
JOIN t2
ON t1.region = t2.region
```

d. What was the percent change in forest area of the world between 1990 and 2016?

CODE:

```
WITH t1 AS (SELECT region, curr_year, SUM(forest_area_sqkm) total
                    FROM forestation
                    GROUP BY 1,2
                    HAVING region = 'World' AND curr_year = 2016),

t2 AS (SELECT region, curr_year, SUM(forest_area_sqkm) total
                    FROM forestation
                    GROUP BY 1,2
                    HAVING region = 'World' AND curr_year = 1990)
SELECT (((t1.total - t2.total)/t2.total) * 100) as percentage_change
FROM t1
JOIN t2
ON t1.region = t2.region
```

e. If you compare the amount of forest area lost between 1990 and 2016, to which country's total area in 2016 is it closest to?

Code:

```
WITH t1 AS (SELECT region, curr_year, SUM(forest_area_sqkm) total
                    FROM forestation
                    GROUP BY 1,2
                    HAVING region = 'World' AND curr_year = 2016),

t2 AS (SELECT region, curr_year, SUM(forest_area_sqkm) total
```

```
                FROM forestation
                GROUP BY 1,2
                HAVING region = 'World' AND curr_year = 1990),
t3 AS (
                SELECT (t2.total - t1.total) diff
                        FROM t1
                        JOIN t2
                        ON t1.region = t2.region
)

SELECT country_name,(total_area_sq_mi * 2.59) total
FROM forestation
WHERE curr_year = 2016 AND (total_area_sq_mi * 2.59)<=(SELECT * FROM t3)
ORDER BY 2 DESC
LIMIT 1
```

2. REGIONAL OUTLOOK

a. What was the percent forest of the entire world in 2016?

Code:

```
SELECT  region, SUM(forest_area_sqkm)sum_forest_area_sqkm
,SUM(((total_area_sq_mi)*2.59)) AS sum_total_area_sq_km,
(((SUM(forest_area_sqkm)) /(SUM(((total_area_sq_mi)*2.59)))) * 100) fr_perecent
FROM forestation
WHERE (curr_year = 2016)
GROUP BY 1
HAVING region = 'World'
```

Which region had the HIGHEST percent forest in 2016,

```
SELECT  region, SUM(forest_area_sqkm)sum_forest_area_sqkm
        ,SUM(((total_area_sq_mi)*2.59)) AS sum_total_area_sq_km,
(((SUM(forest_area_sqkm)) /(SUM(((total_area_sq_mi)*2.59)))) * 100) fr_perecent

FROM forestation

WHERE (curr_year = 2016)

GROUP BY 1

ORDER BY 4 DESC

LIMIT 1
```

and which had the LOWEST, to 2 decimal places?

```
SELECT  region, SUM(forest_area_sqkm)sum_forest_area_sqkm
        ,SUM(((total_area_sq_mi)*2.59)) AS sum_total_area_sq_km,
(((SUM(forest_area_sqkm)) /(SUM(((total_area_sq_mi)*2.59)))) * 100) fr_perecent

FROM forestation

WHERE (curr_year = 2016)

GROUP BY 1

ORDER BY 4

LIMIT 1
```

b. What was the percent forest of the entire world in 1990?

Code:

```
SELECT  region, SUM(forest_area_sqkm)sum_forest_area_sqkm
        ,SUM(((total_area_sq_mi)*2.59)) AS sum_total_area_sq_km,
(((SUM(forest_area_sqkm)) /(SUM(((total_area_sq_mi)*2.59)))) * 100) fr_percent

FROM forestation

WHERE (curr_year = 1990)
```

```
GROUP BY 1

HAVING region = 'World'
```

Which region had the HIGHEST percent forest in 1990

```
SELECT  region, SUM(forest_area_sqkm)sum_forest_area_sqkm
        ,SUM(((total_area_sq_mi)*2.59)) AS sum_total_area_sq_km,
(((SUM(forest_area_sqkm)) /(SUM(((total_area_sq_mi)*2.59)))) * 100) fr_perecent

FROM forestation

WHERE (curr_year = 1990)

GROUP BY 1

ORDER BY 4 DESC

LIMIT 1
```

and which had the LOWEST, to 2 decimal places?

```
SELECT  region, SUM(forest_area_sqkm)sum_forest_area_sqkm
        ,SUM(((total_area_sq_mi)*2.59)) AS sum_total_area_sq_km,
(((SUM(forest_area_sqkm)) /(SUM(((total_area_sq_mi)*2.59)))) * 100) fr_perecent

FROM forestation

WHERE (curr_year = 1990)

GROUP BY 1

ORDER BY 4

LIMIT 1
```

c. Based on the table you created, which regions of the world DECREASED in forest area from 1990 to 2016?

Code:

```
SELECT  region,curr_year, SUM(forest_area_sqkm)sum_forest_area_sqkm
        ,SUM(((total_area_sq_mi)*2.59)) AS sum_total_area_sq_km,
(((SUM(forest_area_sqkm)) /(SUM(((total_area_sq_mi)*2.59)))) * 100) fr_perecent
FROM forestation
WHERE curr_year = 2016 OR curr_year = 1990
GROUP BY 1,2
```

3. COUNTRY-LEVEL DETAIL

a. Which 5 countries saw the largest amount decrease in forest area from 1990 to 2016? What was the difference in forest area for each?

```
WITH t1 AS

    (SELECT country_code,       country_name,       curr_year, region,
      forest_area_sqkm

    FROM FORESTATION

    WHERE curr_year = 2016),

t2 AS (

            SELECT country_code,       country_name,       curr_year, region,
      forest_area_sqkm

    FROM FORESTATION

    WHERE curr_year = 1990

)


SELECT t1.country_code, t1.country_name,t1.region,t1.forest_area_sqkm fr1 ,
t2.forest_area_sqkm fr2,(t2.forest_area_sqkm - t1.forest_area_sqkm) difference
```

```
FROM t1

JOIN t2

ON t1.country_code = t2.country_code

WHERE (t2.forest_area_sqkm - t1.forest_area_sqkm) IS NOT NULL AND
(t1.country_name != 'World')

ORDER BY 6 DESC

LIMIT 5
```

b. Which 5 countries saw the largest percent decrease in forest area from 1990 to 2016? What was the percent change to 2 decimal places for each?

```
WITH t1 AS

    (SELECT country_code,       country_name,       curr_year, region,
      forest_area_sqkm

    FROM FORESTATION

    WHERE curr_year = 2016),

t2 AS (

            SELECT country_code,       country_name,       curr_year, region,
      forest_area_sqkm

    FROM FORESTATION

    WHERE curr_year = 1990

)


SELECT t1.country_code, t1.country_name,t1.region,t1.forest_area_sqkm fr2016 ,
t2.forest_area_sqkm fr1990,(((t1.forest_area_sqkm -
t2.forest_area_sqkm)/t2.forest_area_sqkm)*100) percent

FROM t1

JOIN t2
```

```
ON t1.country_code = t2.country_code

WHERE (t1.country_name != 'World') AND (((t1.forest_area_sqkm -
t2.forest_area_sqkm)/t2.forest_area_sqkm)*100) IS NOT NULL

ORDER BY 6

LIMIT 5
```

c. If countries were grouped by percent forestation in quartiles, which group had the most countries in it in 2016?

```
WITH t1 AS

      (SELECT country_code,        country_name,       curr_year, region,
        forest_area_sqkm

      FROM FORESTATION

      WHERE curr_year = 2016),

t2 AS (

            SELECT country_code,       country_name,       curr_year, region,
        forest_area_sqkm

      FROM FORESTATION

      WHERE curr_year = 1990

)



SELECT t1.country_code, t1.country_name,t1.region,t1.forest_area_sqkm fr2016 ,
t2.forest_area_sqkm fr1990,(((t1.forest_area_sqkm -
t2.forest_area_sqkm)/t2.forest_area_sqkm)*100) percent

FROM t1

JOIN t2

ON t1.country_code = t2.country_code
```

```
WHERE (t1.country_name != 'World') AND (((t1.forest_area_sqkm -
t2.forest_area_sqkm)/t2.forest_area_sqkm)*100) IS NOT NULL

ORDER BY 6

LIMIT 5
```

d. List all of the countries that were in the 4th quartile (percent forest > 75%) in 2016.

```
WITH t1 AS (SELECT country_name, percent, region,
    CASE
        WHEN percent <= 25 THEN ' < 25% '
        WHEN percent > 25 AND percent <= 50 THEN '25% - 50%'
        WHEN percent > 50 AND percent <= 75 THEN '50% - 75%'
        ELSE ' 75% - 100%'
        END AS quartile
FROM forestation
WHERE curr_year = 2016 AND percent IS NOT NULL)


SELECT *
FROM t1
WHERE quartile = ' 75% - 100%'
ORDER BY 2 DESC
```

e. How many countries had a percent forestation higher than the United States in 2016?

```
WITH T1 AS (
	SELECT percent
	FROM
	forestation2016
	WHERE country_name = 'United States'
)

SELECT country_name, percent
FROM forestation2016
WHERE percent > (SELECT * FROM t1)
```