

Steps to Complete

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).

```
CREATE VIEW Forestation
AS
SELECT
f.country_code,f.country_name,f.year,f.forest_area_sqkm,l.total_area_sq_mi,r.region,r.
income_group, (f.forest_area_sqkm * 100/(l.total_area_sq_mi*2.59)) AS
percentage_ld_to_forest
FROM forest_area f
JOIN land_area l
ON f.country_code = l.country_code AND f.year = l.year
JOIN regions r
ON r.country_code = f.country_code;
```

1. GLOBAL SITUATION

Instructions:

- Answering these questions will help you add information into the template.
- Use these questions as guides to write SQL queries.
- Use the output from the query to answer these questions.
 - 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.

41282694.9

```
SELECT country_name, year, forest_area_sqkm
FROM Forestation
WHERE year = 1990
AND country_name = 'World';
```

OR

```
SELECT country_code, year, forest_area_sqkm
FROM forest_area
WHERE year = 1990
AND country_code = 'WLD';
```

- 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."

39958245.9

```
SELECT country_code, year, forest_area_sqkm
FROM forest_area
WHERE year = 2016
AND country_name = 'World';
```

OR

```
SELECT country_name, year, forest_area_sqkm
FROM Forestation
WHERE year = 2016
AND country_name = 'World';
```

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

1324449

```
SELECT ( a.forest_area_sqkm-b.forest_area_sqkm ) AS loss_sqkm,
( a.forest_area_sqkm-b.forest_area_sqkm ) * 100 / a.forest_area_sqkm
loss_percent
FROM forestation a,
forestation b
WHERE a.year = 1990
AND b.year = 2016
AND a.country_name = 'World'
AND b.country_name = 'World'
FETCH first ROW only
```

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

3.21%

```
SELECT ( a.forest_area_sqkm-b.forest_area_sqkm ) AS loss_sqkm,
( a.forest_area_sqkm-b.forest_area_sqkm ) * 100 / a.forest_area_sqkm
loss_percent
FROM forestation a,
forestation b
WHERE a.year = 1990
AND b.year = 2016
AND a.country_name = 'World'
AND b.country_name = 'World'
FETCH first ROW only
```

- 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?

China

```
SELECT f.country_name, (f.forest_area_sqkm - t.forest_area_sqkm) AS  
forest_difference
```

```
FROM forestation f
```

```
JOIN (
```

```
SELECT a.country_name, a.year, a.forest_area_sqkm
```

```
FROM forestation a
```

```
WHERE year IN (1990)
```

```
AND a.forest_area_sqkm IS NOT NULL) t
```

```
ON f.country_name = t.country_name
```

```
WHERE f.year = 2016
```

```
AND f.forest_area_sqkm IS NOT NULL
```

```
ORDER BY 2 DESC
```

```
SELECT f.country_name, (f.forest_area_sqkm - f2.forest_area_sqkm) AS  
forest_difference
```

```
FROM forestation f
```

**JOIN (SELECT before.country_name, before.year,
before.forest_area_sqkm**

FROM forestation before

WHERE year IN (1990)

AND before.forest_area_sqkm IS NOT NULL) f2

ON f.country_name = f2.country_name

WHERE f.year = 2016

AND f.forest_area_sqkm IS NOT NULL

ORDER BY 2 DESC

My code

WITH

before AS

**(SELECT country_name,forest_area_sqkm FROM forest_area WHERE
year IN (1990) AND forest_area_sqkm IS NOT NULL),**

after AS

**(SELECT country_name,forest_area_sqkm FROM forest_area WHERE
year IN (2016) AND forest_area_sqkm IS NOT NULL)**

**SELECT DISTINCT before.country_name, (before.forest_area_sqkm -
after.forest_area_sqkm) AS forest_diff**

FROM forestation before

JOIN forestation after

ON before.country_name = after.country_name

ORDER BY forest_diff DESC;

ALSO

SELECT DISTINCT *

FROM forestation

WHERE country_name = 'China' OR country_name = 'United States';

2. REGIONAL OUTLOOK

Instructions:

- Answering these questions will help you add information into the template.
- Use these questions as guides to write SQL queries.
- Use the output from the query to answer these questions.
- Create a table that shows the Regions and their percent forest area (sum of forest area divided by sum of land area) in 1990 and 2016. (Note that 1 sq mi = 2.59 sq km).

Based on the table you created,

- a. What was the percent forest of the entire world in 2016? Which region had the HIGHEST percent forest in 2016, and which had the LOWEST, to 2 decimal places?

(i) 31.38%

```
SELECT percentage_ld_to_forest
```

```
FROM forestation
```

```
WHERE country_name = 'World'
```

```
AND year = 2016;
```

(ii) Highest Region is Latin America & Caribbean 46.16%

```
SELECT region, year,  
(sum(forest_area_sqkm)*100)/(sum(total_area_sq_mi*2.59))  
AS regions_forest_area_percent  
INTO regions_forest_area_data  
FROM forestation
```

```
SELECT *  
FROM regions_forest_area_data  
WHERE year IN (1990,2016)  
GROUP BY year, region, regions_forest_area_percent  
ORDER BY regions_forest_area_percent, year;
```

(iii) Lowest Region is Middle East & North Africa 2.07%

```
SELECT *  
FROM regions_forest_area_data  
WHERE year IN (1990,2016)  
GROUP BY year, region, regions_forest_area_percent  
ORDER BY regions_forest_area_percent, year;
```

b. What was the percent forest of the entire world in 1990? Which region had the HIGHEST percent forest in 1990, and which had the LOWEST, to 2 decimal places?

- 32.42%

```
SELECT percentage_ld_to_forest  
  
FROM forestation  
  
WHERE country_name = 'World'  
  
AND year = 1990;
```

- Highest Region is Latin America & Caribbean 51.03%

```
SELECT *  
FROM regions_forest_area_data  
WHERE year IN (1990,2016)  
GROUP BY year, region, regions_forest_area_percent  
ORDER BY regions_forest_area_percent, year;
```

- Lowest Region is Middle East & North Africa 1.78%


```
SELECT *
FROM regions_forest_area_data
WHERE year IN (1990,2016)
GROUP BY year, region, regions_forest_area_percent
ORDER BY regions_forest_area_percent, year;
```

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

Regions that decreased are;

Sub-Saharan Africa

Latin America & Caribbean

```
SELECT region, year,
       (sum(forest_area_sqkm)*100)/(sum(total_area_sq_mi*2.59))
AS regions_forest_area_percent
INTO regions_forest_area_data
FROM forestation
```

```
SELECT *
FROM regions_forest_area_data
WHERE year IN (1990,2016)
GROUP BY year, region, regions_forest_area_percent
ORDER BY regions_forest_area_percent, year;
```

3. COUNTRY-LEVEL DETAIL

Instructions:

- Answering these questions will help you add information into the template.
- Use these questions as guides to write SQL queries.
- Use the output from the query to answer these questions.
 - 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?

Brazil, Indonesia, Myanmar, Nigeria and Tanzania.

```
SELECT a.country_name, (a.forest_area_sqkm - b.forest_area_sqkm) AS  
loss_in_forest, ((a.forest_area_sqkm - b.forest_area_sqkm)*100/a.forest_area_sqkm)  
AS percentage_loss  
FROM forestation a  
JOIN forestation b  
ON a.country_name = b.country_name  
WHERE a.year = 1990  
AND b.year = 2016  
AND a.forest_area_sqkm IS NOT NULL  
AND b.forest_area_sqkm IS NOT NULL  
ORDER BY 2 DESC  
LIMIT 6;
```

- 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?

Togo – 75.45%

Nigeria – 61.80%

Uganda – 59.13%

Mauritania – 46.75%

Honduras – 45.03%

```
SELECT a.country_name, (a.forest_area_sqkm - b.forest_area_sqkm) AS  
loss_in_forest, ((a.forest_area_sqkm - b.forest_area_sqkm)*100/a.forest_area_sqkm)  
AS percentage_loss  
FROM forestation a  
JOIN forestation b  
ON a.country_name = b.country_name  
WHERE a.year = 1990  
AND b.year = 2016  
AND a.forest_area_sqkm IS NOT NULL  
AND b.forest_area_sqkm IS NOT NULL  
ORDER BY 3 DESC  
LIMIT 5;
```

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

The first group (0 – 25%)

```
SELECT DISTINCT(quartiles), COUNT(country_name) OVER (PARTITION BY  
quartiles)  
FROM  
(SELECT country_name, percentage_ld_to_forest,  
NTILE(4) OVER (ORDER BY percentage_ld_to_forest) AS Quartile, CASE  
WHEN percentage_ld_to_forest<=25 THEN '0-25%'  
WHEN percentage_ld_to_forest<=75 AND percentage_ld_to_forest>50 THEN '25% -  
50%'
```

```
WHEN percentage_ld_to_forest<=50 AND percentage_ld_to_forest>25 THEN '50% - 75%'
```

```
ELSE '75% - 100%'
```

```
END AS quartiles
```

```
FROM forestation
```

```
WHERE year = 2016
```

```
AND country_name <> 'World'
```

```
AND percentage_ld_to_forest IS NOT NULL) AS quart;
```

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

```
SELECT country_name, region, percentage_ld_to_forest,
```

```
NTILE(4) OVER (ORDER BY percentage_ld_to_forest) AS Quartile, CASE
```

```
    WHEN percentage_ld_to_forest<=25 THEN '0-25%'
```

```
    WHEN percentage_ld_to_forest<=75 AND percentage_ld_to_forest>50 THEN '25% - 50%'
```

```
    WHEN percentage_ld_to_forest<=50 AND percentage_ld_to_forest>25 THEN '50% - 75%'
```

```
ELSE '75% - 100%'
```

```
END AS quartiles
```

```
FROM forestation
```

```
WHERE year = 2016
```

```
AND country_name <> 'World'
```

```
AND percentage_ld_to_forest IS NOT NULL
```

```
ORDER BY percentage_ld_to_forest DESC;
```

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

94 Countries

```

SELECT COUNT(*) As Count
FROM forestation
WHERE forest_area_sqkm IS NOT NULL
AND year = 2016
AND percentage_ld_to_forest > (SELECT percentage_ld_to_forest FROM
forestation WHERE country_name = 'United States' AND year = 2016);

```

EXTRA QUESTIONS AND CODES

There is one particularly bright spot in the data at the country level,
 ____ China _____. This country actually increased in forest area from 1990 to
 2016 by ____ 527229.062 sqkm ____.

```

SELECT a.country_name, a.forest_area_sqkm AS before, b.forest_area_sqkm
AS after, (a.forest_area_sqkm - b.forest_area_sqkm) AS gain_in_forest,
((a.forest_area_sqkm - b.forest_area_sqkm)*100/a.forest_area_sqkm) AS
percentage_gain
FROM forestation a
JOIN forestation b
ON a.country_name = b.country_name
WHERE a.year = 1990
AND b.year = 2016
AND a.forest_area_sqkm IS NOT NULL
AND b.forest_area_sqkm IS NOT NULL
AND (a.forest_area_sqkm - b.forest_area_sqkm) < 0
ORDER BY 4;

```