In [13]:
```
#Step 1: Import the required libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [15]:
```
# Reading Data
#Step 2: Import the data set
data = pd.read_csv('D:/BU-2020/2022-23/ODD 2022-23/headbrain.csv')
print(data.shape)

print(data.head())
```

```
(237, 4)
   Gender  Age Range  Head Size(cm^3)  Brain Weight(grams)
0       1          1             4512                 1530
1       1          1             3738                 1297
2       1          1             4261                 1335
3       1          1             3777                 1282
4       1          1             4177                 1590
```

In [16]:
```
#Step 3: Assigning ‘X’ as independent variable and ‘Y’ as dependent variable
# Coomputing X and Y
X = data['Head Size(cm^3)'].values
Y = data['Brain Weight(grams)'].values
```

In [18]:
```
# Mean X and Y
mean_x = np.mean(X)
mean_y = np.mean(Y)

# Total number of values
n = len(X)
```

In [19]:
```
#Step 4: Calculate the values of the slope and y-intercept
# Using the formula to calculate 'm' and 'c'
numer = 0
denom = 0
for i in range(n):
    numer += (X[i] - mean_x) * (Y[i] - mean_y)
    denom += (X[i] - mean_x) ** 2
m = numer / denom
c = mean_y - (m * mean_x)

# Printing coefficients
print("Coefficients")
print(m, c)
```

```
Coefficients
0.26342933948939945 325.57342104944223
```

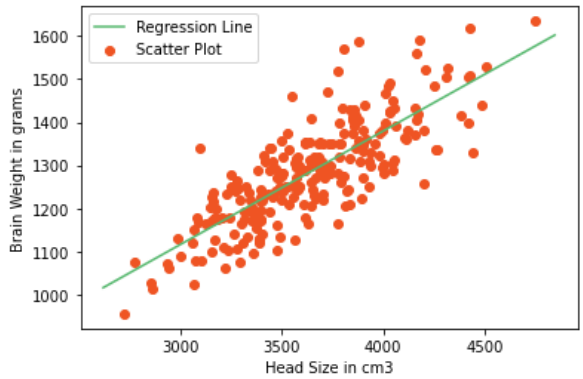
In [9]:
```
#Step 5: Plotting the line of best fit
# Plotting Values and Regression Line

max_x = np.max(X) + 100
min_x = np.min(X) - 100

# Calculating line values x and y
x = np.linspace(min_x, max_x, 1000)
y = c + m * x

# Ploting Line
plt.plot(x, y, color='#58b970', label='Regression Line')
# Ploting Scatter Points
plt.scatter(X, Y, c='#ef5423', label='Scatter Plot')

plt.xlabel('Head Size in cm3')
plt.ylabel('Brain Weight in grams')
plt.legend()
plt.show()
```



In [11]:
```
#Step 6: Model Evaluation
# Calculating Root Mean Squares Error
rmse = 0
for i in range(n):
    y_pred = c + m * X[i]
    rmse += (Y[i] - y_pred) ** 2
rmse = np.sqrt(rmse/n)
print("RMSE")
print(rmse)
```

```
RMSE
72.1206213783709
```

In [12]:
```
# Calculating R2 Score
ss_tot = 0
ss_res = 0
for i in range(n):
    y_pred = c + m * X[i]
    ss_tot += (Y[i] - mean_y) ** 2
    ss_res += (Y[i] - y_pred) ** 2
r2 = 1 - (ss_res/ss_tot)
print("R2 Score")
print(r2)
```

```
R2 Score
0.6393117199570003
```

In [ ]: