```
In [22]: import pandas as pd
In [23]: import numpy as np
In [24]: import seaborn as sns
In [25]: from matplotlib import pyplot as plt
In [26]: riverdata = pd.read_csv('river_data.csv', encoding='ISO-8859-1')
```

In [27]: riverdata

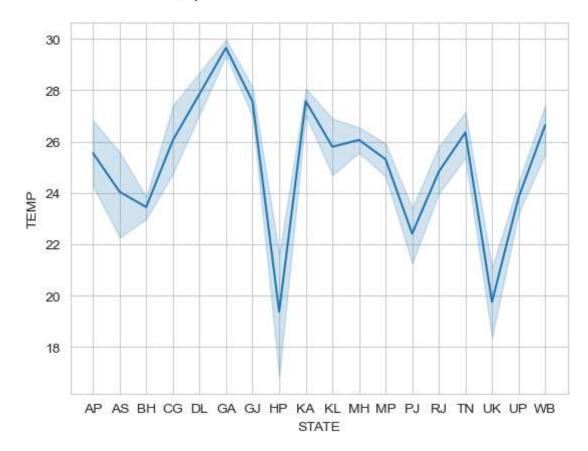
	LOCATIONS	STATE	TEMP	DO	рΗ	CONDUCTIVITY	BOD	NITRATE_N_NITRITE_I
0	AMARAVATI , GUNTUR DIST., A.P	AP	27.6	7.0	7.8	669.0	0.6	0.4
1	GODAVARI AT BASARA, ADILABAD	AP	28.0	5.5	8.1	826.0	1.7	1.0
2	GODAVARI AT BHADRACHALAM D/S BATHING GHAT, KHA	AP	20.2	5.6	8.0	462.0	0.8	1.0
3	GODAVARI AT BHADRACHALAM U/S BATHING GHAT, KHA	АР	20.0	6.0	8.1	443.0	0.3	1.0
4	GODAVARI AT BURGAMPAHAD, KHAMMAM	AP	19.8	6.1	7.9	666.0	1.8	0.8
529	KALJANI D/S OF ALIPURDWAR, MUNICIPALITY DISCHA	WB	28.8	7.6	7.6	141.0	2.4	0.3
530	KAROLA, D/S OF JALPAIGURI, NEAR MIN BHAWAN	WB	27.3	6.7	7.4	166.0	3.0	0.3
531	NABADIP ON GANGA,GHOSHPARA NEAR MONIPURGHAT	WB	27.4	7.4	7.9	353.0	3.3	0.7
532	TEESTA AT SILIGURI	WB	20.8	7.5	7.4	86.0	2.0	0.5
533	TRIBENI ON GANGA, NEAR BURNING GHAT	WB	28.3	6.9	8.0	312.0	2.8	0.8
534 r	rows × 10 columns							
	1 2 3 4 529 530 531 532 533	1 GODAVARI AT BASARA, ADILABAD CONTROL BASARA, ADILABAD GODAVARI AT BHADRACHALAM D/S BATHING GHAT, KHA GODAVARI AT BHADRACHALAM U/S BATHING GHAT, KHA GODAVARI AT BHADRACHALAM U/S BATHING GHAT, KHA KHAMMAM KHAMMAM KHAMMAM KALJANI D/S OF ALIPURDWAR, MUNICIPALITY DISCHA KAROLA, D/S OF JALPAIGURI, NEAR MIN BHAWAN MABADIP ON GANGA,GHOSHPARA MONIPURGHAT TRIBENI ON GANGA, NEAR BURNING	1 GODAVARI AT BHADRACHALAM DIST., A.P 2 GODAVARI AT BHADRACHALAM DIST. KHA 3 GODAVARI AT BHADRACHALAM LIST BHADRACHALAM UIS BATHING GHAT, KHA 4 GODAVARI AT BHADRACHALAM UIS BATHING GHAT, KHA 4 GODAVARI AT BURGAMPAHAD, KHAMMAM 52 KALJANI DIS OF ALIPURDWAR, MUNICIPALITY DISCHA 530 KAROLA, DIS OF JALPAIGURI, NEAR MIN BHAWAN 531 GANGA, GHOSHPARA NEAR MONIPURGHAT 532 TEESTA AT SILIGURI WB TRIBENI ON GANGA, SHAR BURNING GHAT 533 NEAR BURNING WB	AMARAVATI, GUNTUR DIST., A.P 1 GODAVARI AT BASARA, ADILABAD AP 28.0 2 BHADRACHALAM DI/S BATHING GHAT, KHA 3 GODAVARI AT BHADRACHALAM UI/S BATHING GHAT, KHA 4 GODAVARI AT BURGAMPAHAD, KHAMMAM 52 KALJANI DI/S OF ALIPURDWAR, MUNICIPALITY DISCHA 530 KAROLA, DI/S OF JALPAIGURI, NEAR MIN BHAWAN 531 GANGA, GHOSHPARA NEAR MONIPURGHAT 532 TEESTA AT SILIGURI WB 20.8 533 TRIBENI ON GANGA, NEAR BURNING GHAT TRIBENI ON GANGA, SA	0 AMARAVATI , GUNTUR DIST., A.P AP 27.6 7.0 1 GODAVARI AT BASARA, ADILABAD AP 28.0 5.5 2 BASARA, ADILABAD DISBATHING GHAT, KHA AP 20.2 5.6 3 BHADRACHALAM DISBATHING GHAT, KHA AP 20.0 6.0 4 BURGAMPAHAD, KHAMMAM AP 19.8 6.1 529 KALJANI DIS OF ALIPURDWAR, MUNICIPALITY DISCHA WB 28.8 7.6 529 KAROLA, DIS OF ALIPURDWAR, MUNICIPALITY DISCHA WB 27.3 6.7 530 KAROLA, DIS OF MIN BHAWAN WB 27.3 6.7 531 GANGA,GHOSHPARA NEAR MONIPURGHAT WB 27.4 7.4 532 TEESTA AT SILIGURI WB 20.8 7.5 533 TRIBENI ON GANGA, NEAR BURNING GHAT WB 28.3 6.9	AMARAVATI AP 27.6 7.0 7.8	0 AMARAVATI , GUNTUR DIST., A.P. GODAVARI AT BASARA, ADILABAD AP 27.6 7.0 7.8 669.0 1 GODAVARI AT BASARA, ADILABAD DI/S BATHING GHAT, KHA AP 28.0 5.5 8.1 826.0 2 BHADRACHALAM DI/S BATHING GHAT, KHA AP 20.2 5.6 8.0 462.0 3 BHADRACHALAM U/S BATHING GHAT, KHA AP 20.0 6.0 8.1 443.0 4 BURGAMPAHAD, KHAMMAM AP 19.8 6.1 7.9 666.0 529 KALJANI DIS OF ALIPURDWAR, MUNICIPALITY DISCHA WB 28.8 7.6 7.6 141.0 530 KAROLA, D/S OF JALPAIGURI, NEAR MIN BHAWAN WB 27.3 6.7 7.4 166.0 531 GANGA, GHOSHPARA NEAR MONIPURGHAT WB 27.4 7.4 7.9 353.0 532 TEESTA AT SILIGURI WB 20.8 7.5 7.4 86.0 533 TRIBENI ON GANGA, NEAR BURNING GHAT WB 28.3 6.9 8.0 312.0	0 AMARAVATI, GUNTUR DIST., A.P. GODAVARI AT BASARA, ADILABAD AP 27.6 7.0 7.8 669.0 0.6 1 GODAVARI AT BASARA, ADILABAD D/S BATHING GHAT, KHA AP 28.0 5.5 8.1 826.0 1.7 2 BHADRACHALAM D/S BATHING GHAT, KHA AP 20.2 5.6 8.0 462.0 0.8 3 BHADRACHALAM D/S BATHING GHAT, KHA AP 20.0 6.0 8.1 443.0 0.3 4 BURGAMPAHAD, KHAMMAM AP 19.8 6.1 7.9 666.0 1.8 529 KALJANI D/S OF ALIPURDWAR, MUNICIPALITY DISCHA WB 28.8 7.6 7.6 141.0 2.4 530 JALPAIGURI, NEAR MIN BHAWAN WB 27.3 6.7 7.4 166.0 3.0 531 GANGA,GHOSHPARA MEAR MONIPURGHAT WB 27.4 7.4 7.9 353.0 3.3 532 TEESTA AT SILIGURI WB 20.8 7.5 7.4 86.0 2.0 TRIBENI ON GANGA, NEAR BURNIN

```
In [10]: riverdata.dtypes
Out[10]: LOCATIONS
                                  object
                                  object
         STATE
                                 float64
         TEMP
         DO
                                 float64
                                 float64
         рΗ
         CONDUCTIVITY
                                 float64
         BOD
                                 float64
                                 float64
         NITRATE_N_NITRITE_N
         FECAL_COLIFORM
                                 float64
         TOTAL_COLIFORM
                                 float64
         dtype: object
In [11]: # Replacing string NAN values with actual NAN value (np.nan)
         def convert_to_nan(riverdata):
             n col = riverdata.shape[1]
             for index in range(n_col):
                 riverdata.iloc[:, index] = riverdata.iloc[:, index].replace("NAN", n
             return riverdata
         riverdata = convert to nan(riverdata)
In [12]: riverdata.columns
Out[12]: Index(['LOCATIONS', 'STATE', 'TEMP', 'DO', 'pH', 'CONDUCTIVITY', 'BOD',
                 'NITRATE_N_NITRITE_N', 'FECAL_COLIFORM', 'TOTAL_COLIFORM'],
               dtype='object')
 In [ ]:
```

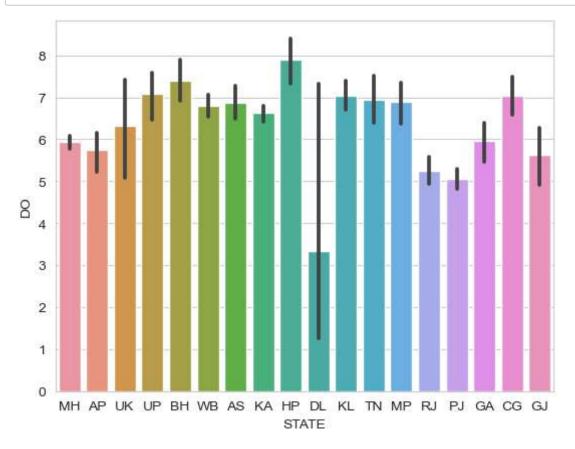
sns.scatterplot(x='STATE', y='LOCATIONS', data=riverdata)

In [57]: sns.lineplot(x='STATE', y='TEMP', data=riverdata)

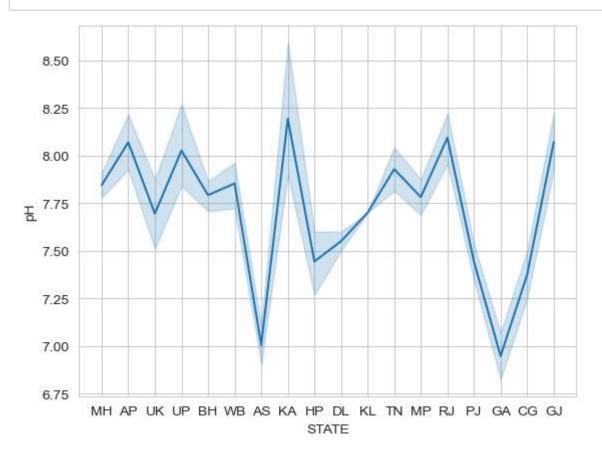
Out[57]: <Axes: xlabel='STATE', ylabel='TEMP'>



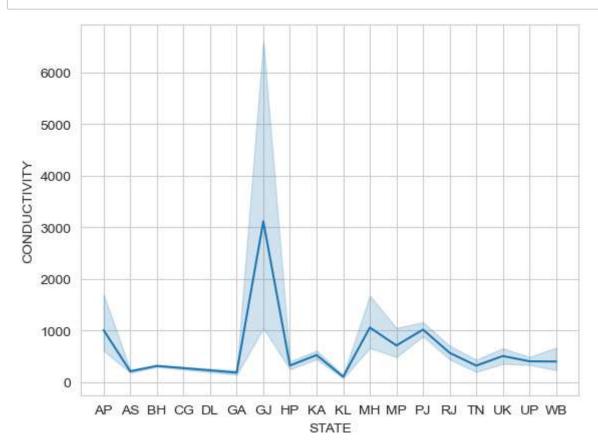
```
In [43]: sns.barplot(x='STATE', y='DO', data=riverdata)
plt.show()
```



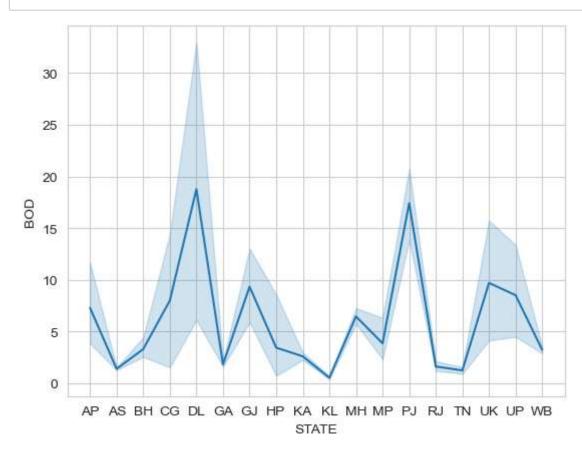
```
In [53]: sns.lineplot(x='STATE', y='pH', data=riverdata)
plt.show()
```



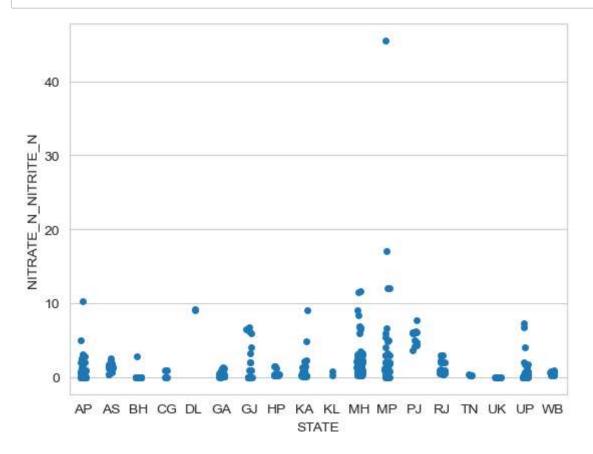
```
In [58]: sns.lineplot(x='STATE', y='CONDUCTIVITY', data=riverdata)
plt.show()
```



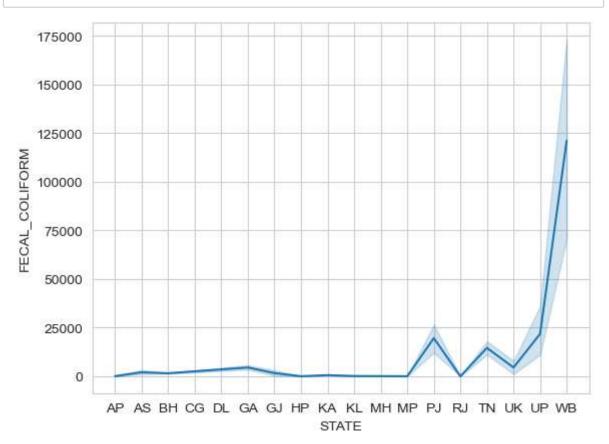
```
In [59]: sns.lineplot(x='STATE', y='BOD', data=riverdata)
plt.show()
```



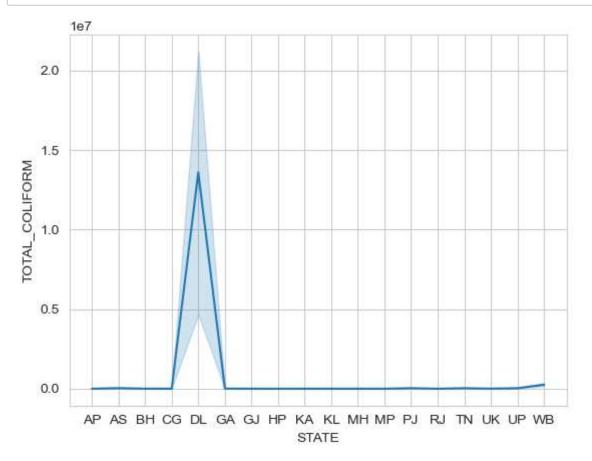
```
In [71]: sns.stripplot(x='STATE', y='NITRATE_N_NITRITE_N', data=riverdata)
plt.show()
```



```
In [61]: sns.lineplot(x='STATE', y='FECAL_COLIFORM', data=riverdata)
plt.show()
```



```
In [72]: sns.lineplot(x='STATE', y='TOTAL_COLIFORM', data=riverdata)
plt.show()
```



In []:	
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