

```
In [68]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import classification_report, confusion_matrix
```

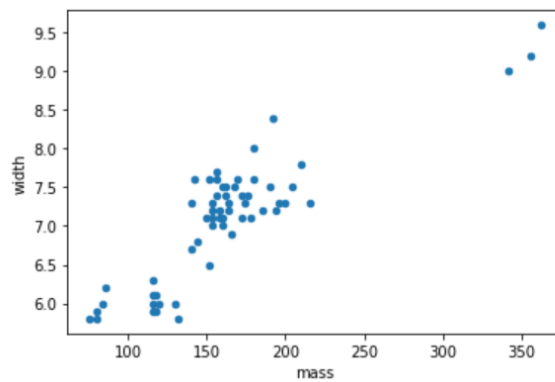
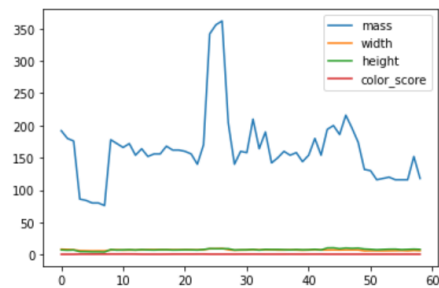
```
In [69]: data = pd.read_excel("fruits.xlsx")
data.head()
```

```
Out[69]:
```

	fruit_label	fruit_name	mass	width	height	color_score
0	1	apple	192	8.4	7.3	0.55
1	1	apple	180	8.0	6.8	0.59
2	1	apple	176	7.4	7.2	0.60
3	2	mandarin	86	6.2	4.7	0.80
4	2	mandarin	84	6.0	4.6	0.79

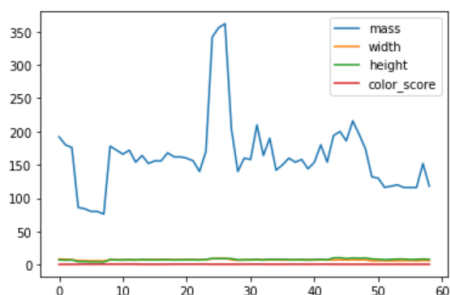
```
In [70]: df.plot()
df.plot(kind='scatter', x='mass', y='width')
```

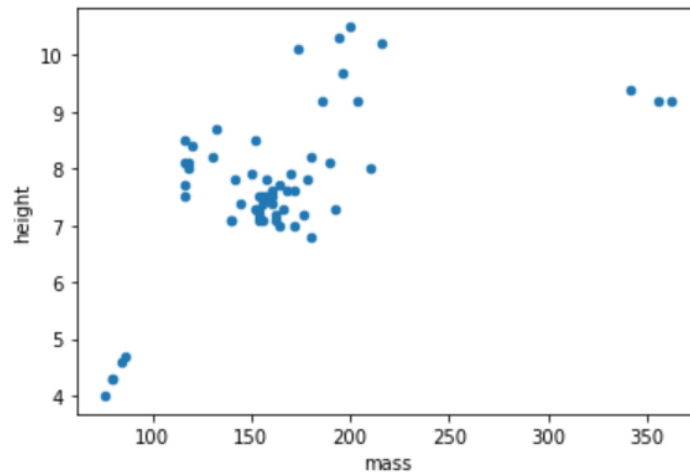
```
Out[70]: <matplotlib.axes._subplots.AxesSubplot at 0x1ed41de3640>
```



```
In [71]: df.plot()
df.plot(kind='scatter', x='mass', y='height')
```

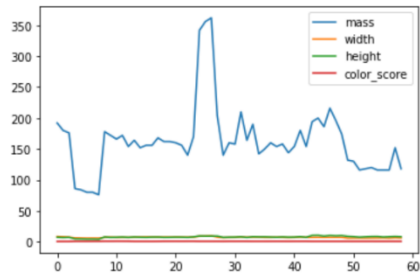
```
Out[71]: <matplotlib.axes._subplots.AxesSubplot at 0x1ed41e98b20>
```





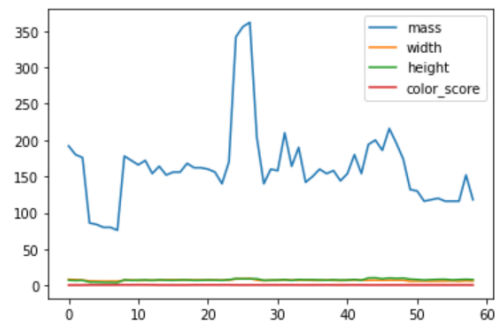
```
In [54]: df.plot()
df.plot(kind='scatter', x='width', y='color_score')
```

Out[54]: <matplotlib.axes._subplots.AxesSubplot at 0x1ed3f4b4b80>



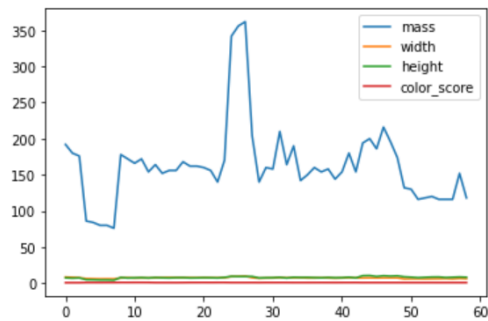
```
In [51]: df.plot()
df.plot(kind='scatter', x='height', y='mass')
```

Out[51]: <matplotlib.axes._subplots.AxesSubplot at 0x1ed40ba4bb0>



```
In [49]: df.plot()
df.plot(kind='scatter', x='height', y='color_score')
```

```
Out[49]: <matplotlib.axes._subplots.AxesSubplot at 0x1ed40a0bc10>
```



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In [ ]: from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.20)
```

```
In [58]: scaler = StandardScaler()
scaler.fit(X_train)
X_train = scaler.transform(X_train)
X_test = scaler.transform(X_test)
```

```
In [59]: classifier = KNeighborsClassifier(n_neighbors=5)
classifier.fit(X_train, y_train)
```

```
Out[59]: KNeighborsClassifier()
```

```
In [60]: y_pred = classifier.predict(X_test)
```

```
In [61]: print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))
```

```
[[5 0 0 1]
 [0 1 0 0]
 [0 0 2 0]
 [0 1 0 2]]
```

	precision	recall	f1-score	support
apple	1.00	0.83	0.91	6
lemon	0.50	1.00	0.67	1
mandarin	1.00	1.00	1.00	2
orange	0.67	0.67	0.67	3
accuracy			0.83	12
macro avg	0.79	0.88	0.81	12
weighted avg	0.88	0.83	0.84	12

