In [4]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt

df = pd.read_csv('ames_clean.csv')
df
```

Out[4]:

	Id	MSSubClass	MSZoning	LotFrontage	LotArea	Street	Alley	LotShape	LandContour	Utilities	...	PoolArea	PoolQC	Fence	MiscFeature	MiscVal	MoSold	Yr
0	1	60	RL	65.0	8450	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	2	2
1	2	20	RL	80.0	9600	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	5	2
2	3	60	RL	68.0	11250	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	9	2
3	4	70	RL	60.0	9550	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	2	2
4	5	60	RL	84.0	14260	Pave	NaN	IR1	Lvl	AllPub	...	0	NaN	NaN	NaN	0	12	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
1455	1456	60	RL	62.0	7917	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	8	2
1456	1457	20	RL	85.0	13175	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	MnPrv	NaN	0	2	2
1457	1458	70	RL	66.0	9042	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	GdPrv	Shed	2500	5	2
1458	1459	20	RL	68.0	9717	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	4	2
1459	1460	20	RL	75.0	9937	Pave	NaN	Reg	Lvl	AllPub	...	0	NaN	NaN	NaN	0	6	2

1460 rows × 81 columns

In [12]:
```
target = 'SalePrice'
df[target].value_counts()
```

Out[12]:
```
SalePrice
140000    20
135000    17
155000    14
145000    14
190000    13
          ..
202665     1
164900     1
208300     1
181500     1
147500     1
Name: count, Length: 663, dtype: int64
```

In [16]:
```
features = df.drop(columns='SalePrice')
features
```

Out[16]:

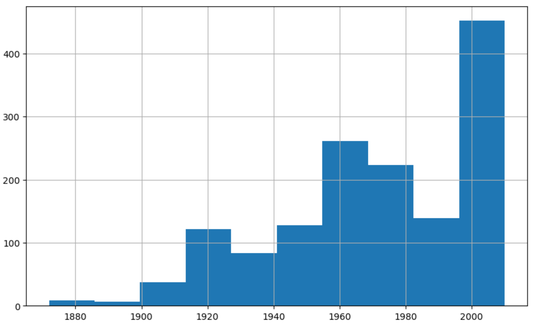
	Id	MSSubClass	MSZoning	LotFrontage	LotArea	Street	Alley	LotShape	LandContour	Utilities	...	ScreenPorch	PoolArea	PoolQC	Fence	MiscFeature	MiscVa
0	1	60	RL	65.0	8450	Pave	NaN	Reg	Lvl	AllPub	...	0	0	NaN	NaN	NaN	0
1	2	20	RL	80.0	9600	Pave	NaN	Reg	Lvl	AllPub	...	0	0	NaN	NaN	NaN	0
2	3	60	RL	68.0	11250	Pave	NaN	IR1	Lvl	AllPub	...	0	0	NaN	NaN	NaN	0
3	4	70	RL	60.0	9550	Pave	NaN	IR1	Lvl	AllPub	...	0	0	NaN	NaN	NaN	0
4	5	60	RL	84.0	14260	Pave	NaN	IR1	Lvl	AllPub	...	0	0	NaN	NaN	NaN	0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1455	1456	60	RL	62.0	7917	Pave	NaN	Reg	Lvl	AllPub	...	0	0	NaN	NaN	NaN	0
1456	1457	20	RL	85.0	13175	Pave	NaN	Reg	Lvl	AllPub	...	0	0	NaN	MnPrv	NaN	0
1457	1458	70	RL	66.0	9042	Pave	NaN	Reg	Lvl	AllPub	...	0	0	NaN	GdPrv	Shed	2500
1458	1459	20	RL	68.0	9717	Pave	NaN	Reg	Lvl	AllPub	...	0	0	NaN	NaN	NaN	0
1459	1460	20	RL	75.0	9937	Pave	NaN	Reg	Lvl	AllPub	...	0	0	NaN	NaN	NaN	0

1460 rows × 80 columns

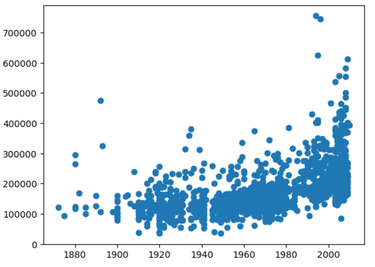
In [163…
```
numeric = features.select_dtypes(include=np.number).columns.values
categorical = features.drop(columns=numeric).columns.values

print(f'''
There are {features.shape[0]} observations and {features.shape[1]} features.
{numeric.size} = Numeric Features Count
{categorical.size} = Categorical Features Count

Numeric: {', '.join(numeric)}.

Categorical: {', '.join(categorical)}.
''')
```

```
There are 1460 observations and 80 features.
37 = Numeric Features Count
43 = Categorical Features Count

Numeric: Id, MSSubClass, LotFrontage, LotArea, OverallQual, OverallCond, YearBuilt, YearRemodAdd, MasVnrArea, BsmtFinSF1, BsmtFinSF2, BsmtUnfSF, TotalBsmt
SF, 1stFlrSF, 2ndFlrSF, LowQualFinSF, GrLivArea, BsmtFullBath, BsmtHalfBath, FullBath, HalfBath, BedroomAbvGr, KitchenAbvGr, TotRmsAbvGrd, Fireplaces, Gar
ageYrBlt, GarageCars, GarageArea, WoodDeckSF, OpenPorchSF, EnclosedPorch, 3SsnPorch, ScreenPorch, PoolArea, MiscVal, MoSold, YrSold.

Categorical: MSZoning, Street, Alley, LotShape, LandContour, Utilities, LotConfig, LandSlope, Neighborhood, Condition1, Condition2, BldgType, HouseStyle,
RoofStyle, RoofMatl, Exterior1st, Exterior2nd, MasVnrType, ExterQual, ExterCond, Foundation, BsmtQual, BsmtCond, BsmtExposure, BsmtFinType1, BsmtFinType2,
Heating, HeatingQC, CentralAir, Electrical, KitchenQual, Functional, FireplaceQu, GarageType, GarageFinish, GarageQual, GarageCond, PavedDrive, PoolQC, Fe
nce, MiscFeature, SaleType, SaleCondition.
```

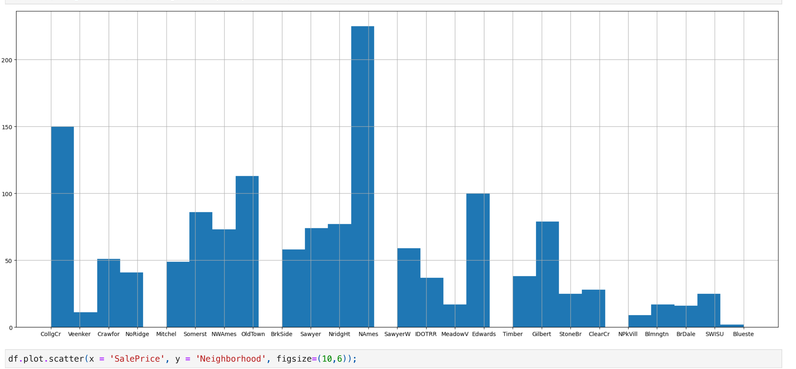
In [90]:
```
features['YearBuilt'].hist(figsize=(10, 6));
```



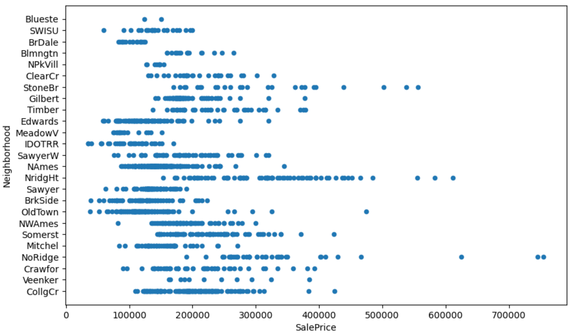
In [92]:
```
plt.scatter(df[['YearBuilt']], df[['SalePrice']])
plt.show()
```



In [122…
```
features['Neighborhood'].hist(figsize=(24, 10), bins=30);
```



In [159…
```
df.plot.scatter(x = 'SalePrice', y = 'Neighborhood', figsize=(10,6));
```



In [ ]: