you don't connect the dots in a scatter plot.

5.1 Lesson

Key Vocabulary
scatter plot, *p. 348*

Key Idea

Scatter Plot

A **scatter plot** is a graph that shows the relationship between two data sets. The two sets of data are graphed as ordered pairs in a coordinate plane.

Example 1 Making a Scatter Plot

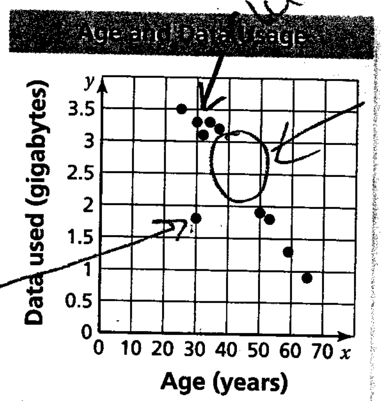
Age (years)	Data Used (gigabytes)
37	3.2
30	3.3
32	3.1
65	0.9
53	1.8
25	3.5
59	1.3
30	1.8
50	1.9
34	3.3

The table shows the ages of 10 adults and the numbers of gigabytes of cell phone data used by each adult in 1 month. Make a scatter plot of the data. Identify any outliers, gaps, or clusters.

Use ordered pairs (x, y) to represent the data, where x represents age (in years) and y represents data used (in gigabytes). Then plot the ordered pairs in a coordinate plane and analyze the scatter plot.

(37, 3.2)	(25, 3.5)
(30, 3.3)	(59, 1.3)
(32, 3.1)	(30, 1.8)
(65, 0.9)	(50, 1.9)
(53, 1.8)	(34, 3.3)

outlier

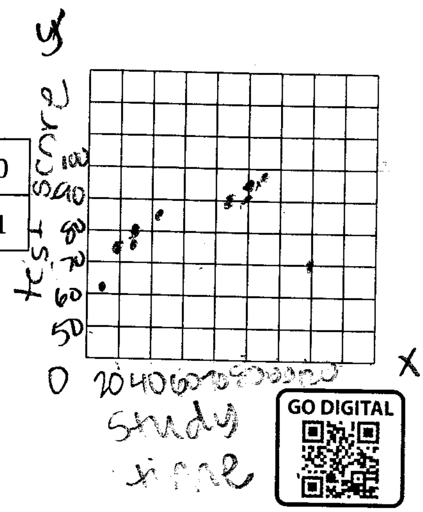


▶ There appears to be an outlier at (30, 1.8). There is a cluster of data from 25 years old to 37 years old and a gap in the data from 37 years old to 50 years old.

Try It

1. Make a scatter plot of the data. Identify any outliers, gaps, or clusters.

Study Time (min), x	30	20	80	90	45	10	30	75	120	80
Test Score, y	80	74	95	97	85	62	83	90	70	91



outliers - 120 min, 70%
gaps - from 45 min to 75 min
and 90 to 120

GO DIGITAL

outlier

numbers that are far from the others in the data they "stick out"

gaps

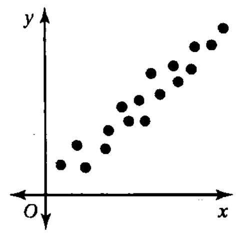
missing data space where theres no dots

cluster

where most of the data is a lot of dots around each other

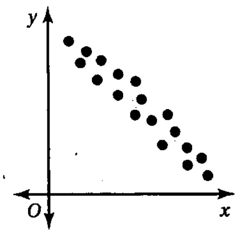
A scatter plot can show relationships between two data sets.

Positive Linear Relationship



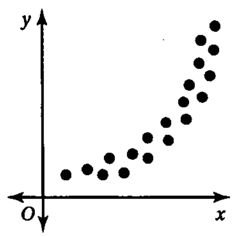
The points approximate a line. As x increases, y increases. goes up

Negative Linear Relationship



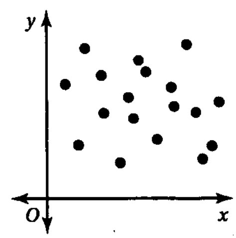
The points approximate a line. As x increases, y decreases. goes down

Nonlinear Relationship



The points approximate the shape of a curve.

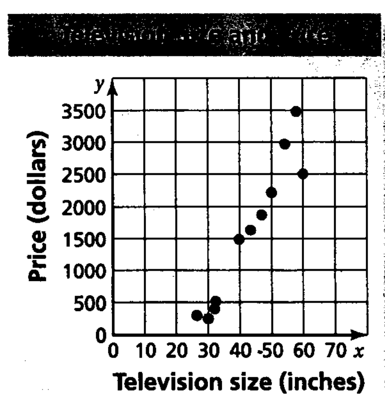
No Relationship



The points show no pattern.

Example 2 Describing Relationships

Describe the relationship between the data in the scatter plot.



The points approximate a line with a positive slope. As x increases, y increases.

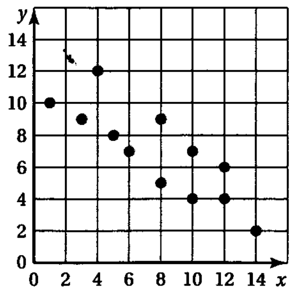
▶ So, the scatter plot shows a positive linear relationship.

GO DIGITAL

Try It

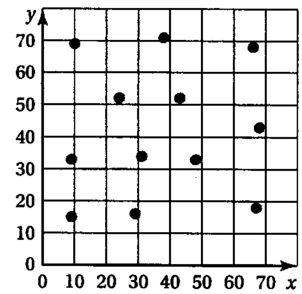
DESCRIBING RELATIONSHIPS **Describe the relationship between the data.**

2.



negative linear relat.

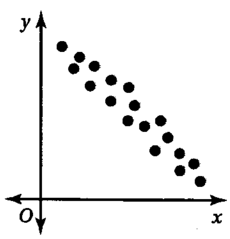
3.



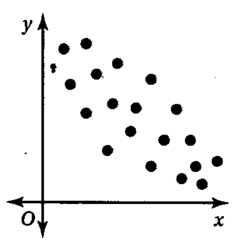
no relat.

The closer the points are to a line or a curve, the stronger the relationship.

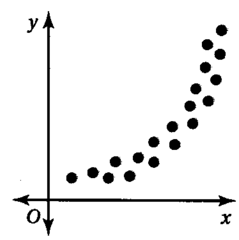
Strong Linear Relationship



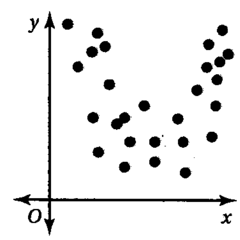
Weak Linear Relationship



Strong Nonlinear Relationship



Weak Nonlinear Relationship



Example 3 B.E.S.T. Test Prep: Describing Relationships

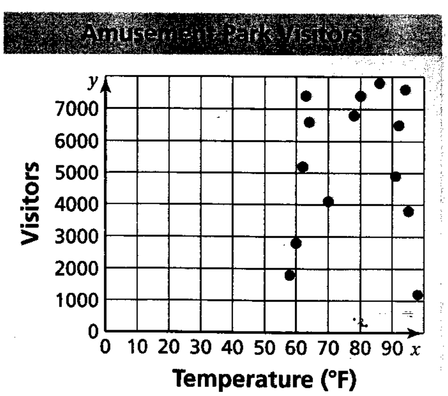
Which of the following best describes the relationship between the data in the scatter plot?

Ⓐ weak positive linear relationship

Ⓑ strong nonlinear relationship

Ⓒ weak nonlinear relationship

Ⓓ no relationship



The points approximate the shape of a curve, so the relationship is nonlinear. The points do not lie very close to the curve, so the relationship is weak. So, the relationship is a weak nonlinear relationship.

▶ The correct answer is Ⓒ.

GO DIGITAL

Try It

4. Describe the relationship between the data in Example 1.

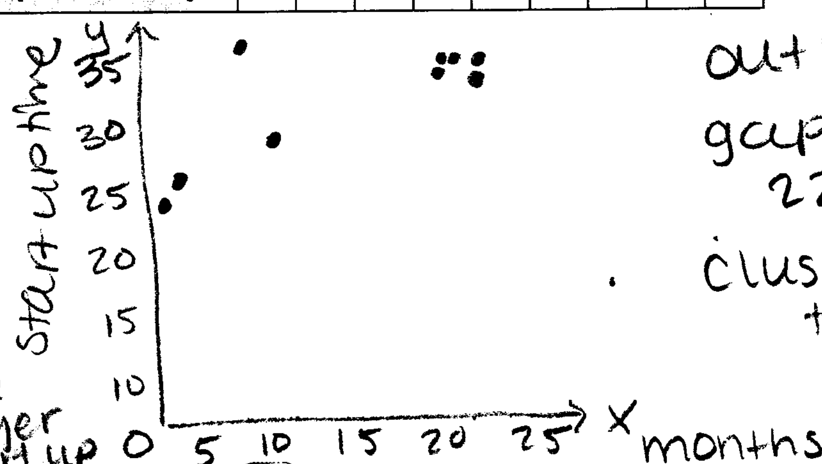
In-Class Practice

1 I don't understand yet. **2** I can do it with help. **3** I can do it on my own. **4** I can teach someone else.

5. **SCATTER PLOT** Make a scatter plot of the data. Identify any outliers, gaps, or clusters. Then describe the relationship between the data.

Phone Age (months), *x*	3	22	23	22	8	12	24	4	23
Start-up Time (sec), *y*	24	34	34	33	36	29	34	27	33

strong positive linear relat.

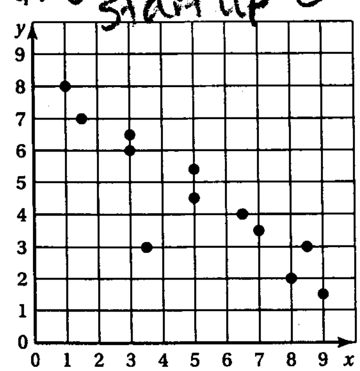


outlier (8, 36)

gaps from 12 months to 22 months

cluster from 22 to 24 months

the older the phone the longer start up



4 MTR 6. **WHICH ONE DOESN'T BELONG?** Using the scatter plot, which point does *not* belong with the other three? Explain your reasoning.

(1, 8) (3, 6.5) (3.5, 3) (8, 2)

It is an outlier