

Interpreting Graphs

STRAND: Probability and Statistics

STRAND CONCEPT: Data Representation and Interpretation

SOL 5.16a,b,c; 6.10a,b,c; 8.13a,b

Remediation Plan Summary

Students will develop skills in interpreting graphical representations of data. They will discuss statistics that can be developed from graphs, compare and contrast data, find unique and common features, describe trends and relationships between variables, and make predictions from the data. Scatterplots are not introduced until 8th grade. Teachers can substitute the scatterplots in this lesson with other types of graphs if this lesson is used with younger students.

Common Errors and Misconceptions

Students have a difficult time understanding and interpreting graphs. They need reminders of which is the x-axis and y-axis.

Materials

- Set of 36 graph, data, and summary cards

Introductory Activity

Ask students to recall different types of graphs that they have studied in mathematics (e.g., picture graphs, object graphs, pictographs, bar graphs, line graphs, stem and leaf plots). Ask the students to provide a description of each graph? Discuss the similarities and differences of each type of graph. Use this time to clear up any student misunderstandings of each type of graph.

Plan for Instruction

1. Distribute the graph, data, and summary cards. Each student should receive only one card. There are three cards that represent the same set of data. One card will have the raw data, a second card will have a graph of the data, and the third card will have a written summary of the data and graph. There are three sets of three cards representing the following data:
 - Calories in Ice Cream and Yogurt
 - Income for Male College Graduates
 - Fat grams in Fast Food
 - Level of Education for Adults
2. Because there are three sets for each of the above, the students cannot determine their match by just looking at the titles. The students must sort out which data matches the graph and summary. There are a total of 36 cards. If there are fewer than 36 students, remove cards in matching sets.
3. Use one matching set of cards as a demonstration. Show the data, discuss what type of graph would be appropriate for this data, provide an example graph that could be used for

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the data, and discuss the conclusions that can be drawn from the graph and the data, showing an example write-up of the data.

4. Students should circulate around the room to find the two people who have cards that match their card.

Pulling It All Together (Reflection)

Ask students to discuss when it is more appropriate to use each type of graph. Give examples of situations.

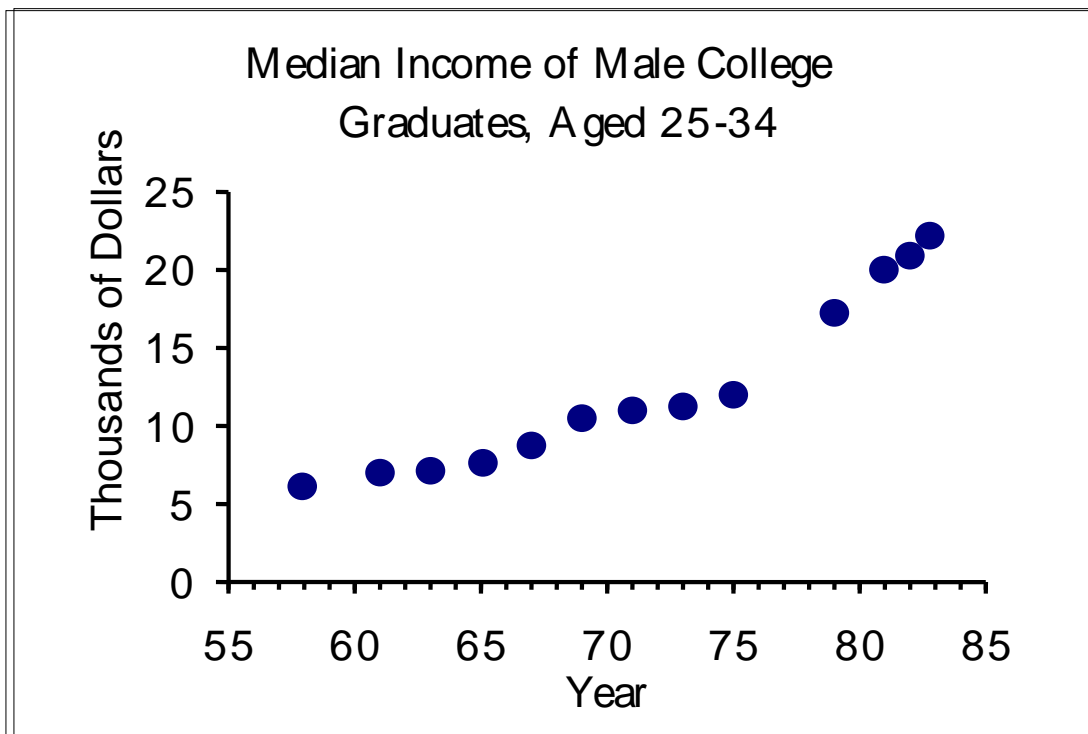
Note: The following pages are intended for classroom use for students as a visual aid to learning.

Virginia Department of Education

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Year	Income Thousands of Dollars
1958	6
1961	6.8
1963	6.9
1965	7.3
1967	8.7
1969	10.4
1971	10.9
1973	11.3
1975	12.1
1979	17.2
1981	20.3
1982	21.1
1983	21.9

DATA-GRAPH-SUMMARY MATCH ACTIVITY



DATA-GRAPH-SUMMARY MATCH ACTIVITY

The graph illustrates the median income of college graduates, aged 25 - 34. It shows an upward trend in income over the past 25 years from 1958 to 1983. It appears that incomes rose slowly from 1958 to 1975 and then rose more rapidly from 1975 to 1983, with the largest one-year increase in the late seventies.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Year	Income Thousands of Dollars
1958	4
1961	6.2
1963	6.9
1965	7.3
1967	8.7
1969	10.4
1971	10.9
1973	11.3
1975	10.9
1979	7.3
1981	8.5
1982	6.5
1983	6

DATA-GRAPH-SUMMARY MATCH ACTIVITY



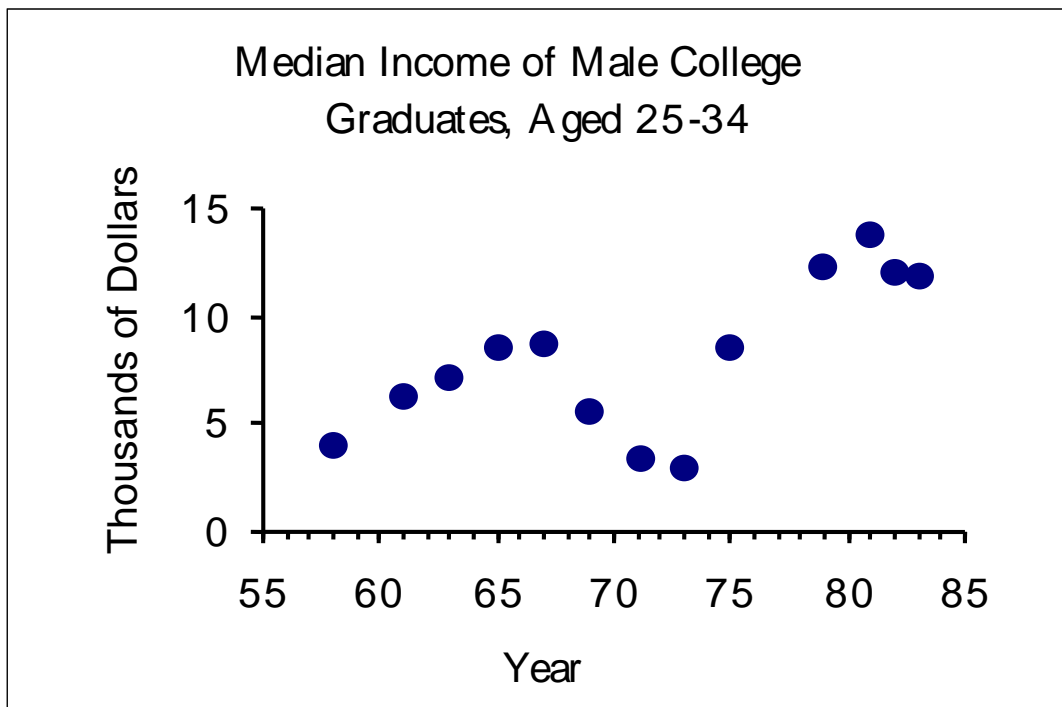
DATA-GRAPH-SUMMARY MATCH ACTIVITY

The graph illustrates the median income of college graduates, aged 25 - 34. It illustrates that income rose during approximately the first twenty years of this analysis from 1958 to 1973. After 1973, incomes began declining, dropping rapidly from 1975 and 1978.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Year	Income Thousands of Dollars
1958	4
1961	6.2
1963	7
1965	8.5
1967	8.7
1969	5.5
1971	3.5
1973	3
1975	8.5
1979	12.5
1981	13.8
1982	12
1983	11.8

DATA-GRAPH-SUMMARY MATCH ACTIVITY



DATA-GRAPH-SUMMARY MATCH ACTIVITY

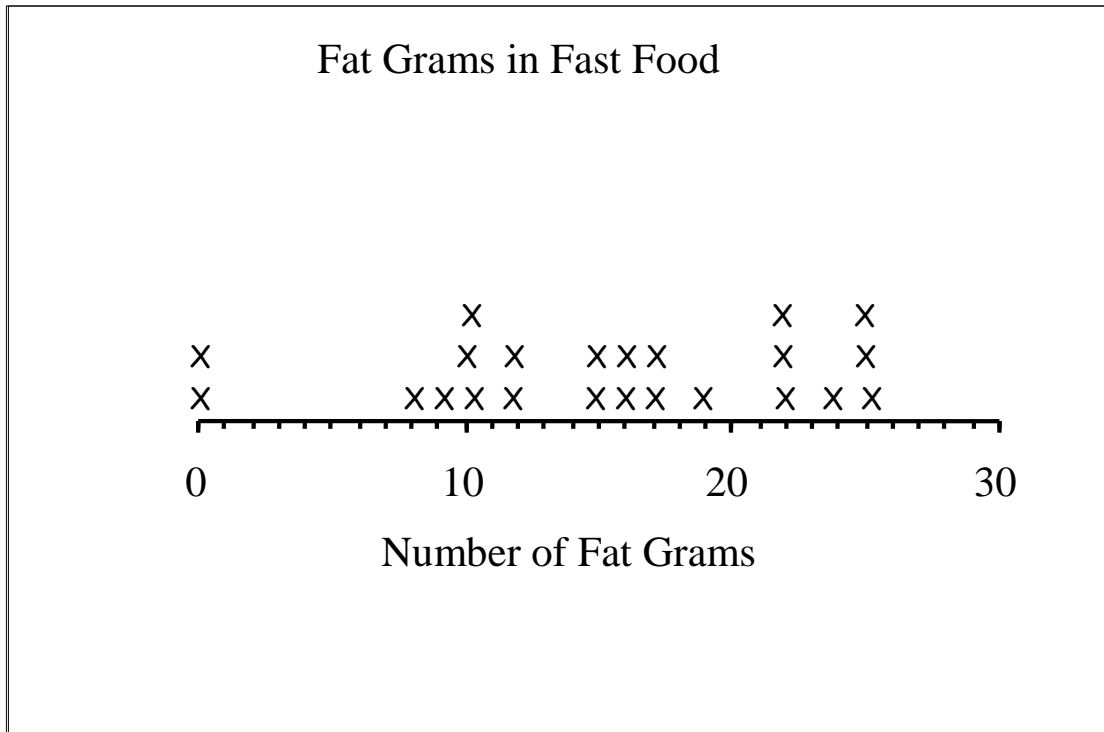
The graph illustrates the median income of college graduates, aged 25 - 34. The graph suggests that median income followed a cyclical pattern during the years from 1958 to 1983. Specifically, the median income rose steadily from 1958 to 1967, declined rapidly from 1967 to 1973, rose rapidly from 1973 to a peak of approximately \$15,000 in 1982 before leveling off in 1982 and 1983.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Fat Grams in Fast Food

0	22
17	17
12	12
16	0
9	8
10	16
22	15
15	10
25	25
10	19
22	24
25	

DATA-GRAPH-SUMMARY MATCH ACTIVITY



DATA-GRAPH-SUMMARY MATCH ACTIVITY

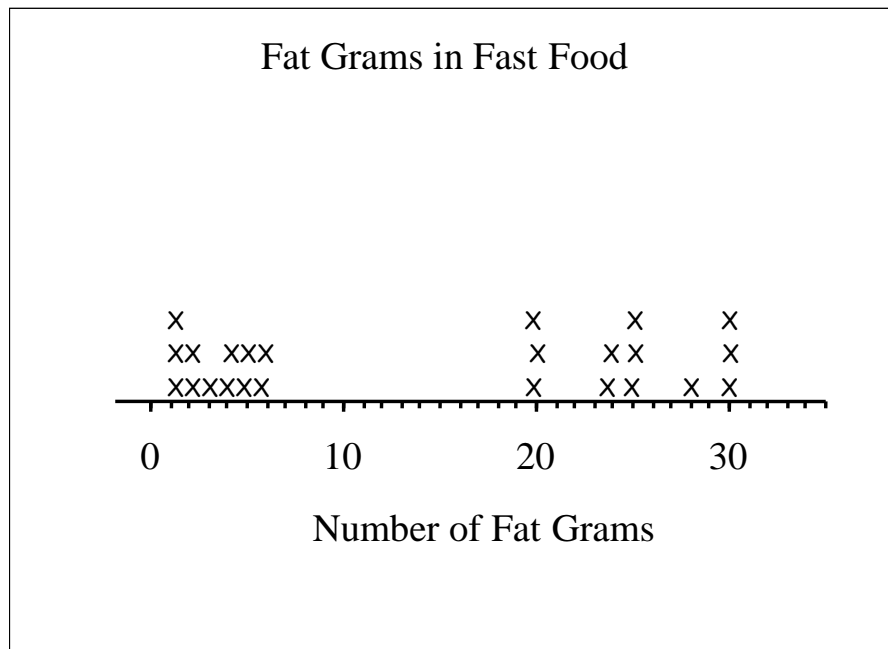
The data represent the number of fat grams in food purchased from a fast food restaurant. The graph shows that the amount of fat grams range from 0 grams to approximately 25 grams. There are a few items with zero grams of fat, most likely diet soda. However, most of the items have over 10 grams of fat.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Fat Grams in Fast Food

20	28
4	5
1	20
30	1
20	25
2	1
2	30
3	24
25	5
6	30
4	24
25	6

DATA-GRAPH-SUMMARY MATCH ACTIVITY



DATA-GRAPH-SUMMARY MATCH ACTIVITY

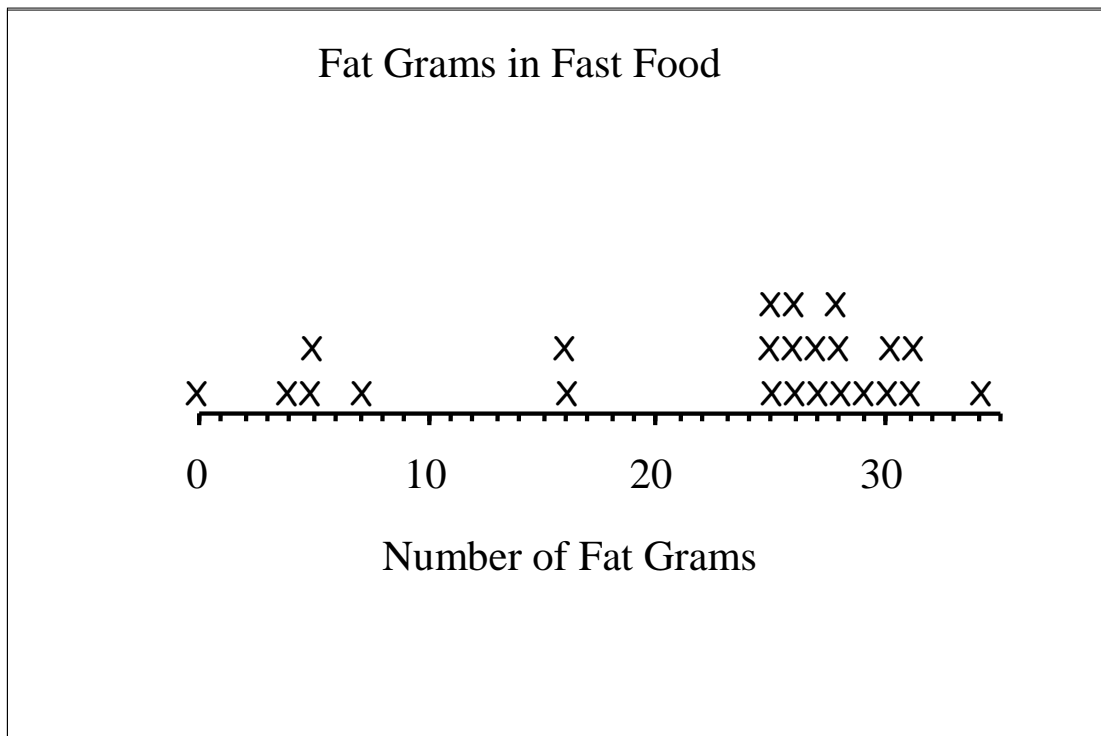
The data represent the number of fat grams in food purchased from a fast food restaurant. The graph shows that there appears to be two clusters of data, relatively healthy food with between 1 and 6 grams of fat and food that is not healthy with between 20 and 30 grams of fat.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Fat Grams in Fast Food

31	27
27	30
16	4
0	28
26	5
16	30
7	5
25	25
26	28
28	25
26	29
31	34

DATA-GRAPH-SUMMARY MATCH ACTIVITY



DATA-GRAPH-SUMMARY MATCH ACTIVITY

The data represent the number of fat grams in food purchased from a fast food restaurant. The graph shows that the amount of fat grams ranges from 0 grams to approximately 34 grams. There is a cluster of items around 5 to 8 grams but the largest cluster is between 25 and 31 grams. This cluster at the high fat contents implies that fast food is very high in fat grams.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Calories per Serving	
Ice Cream	Yogurt
150	100
150	120
175	125
200	130
205	140
205	150
210	155
215	155
215	160
220	165
225	170
225	170
230	175
240	180
250	180
275	185
300	190
305	200

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Ice Cream Versus Yogurt - Calories Per Serving

Ice Cream	Yogurt
	10
	11
	12
	13
	14
0, 0	15
	16
5	17
	18
	19
5, 5, 0	20
5, 5, 0	21
5, 5, 0	22
0	23
0	24
0	25
	26
5	27
	28
	29
5, 0	30

Key: 5| 21 = 215
 21| 0 = 210

DATA-GRAPH-SUMMARY MATCH ACTIVITY

The data represent the number of calories in a serving of various brands of ice cream and yogurt. It appears that ice cream generally has more calories. Its median is approximately 220 calories compared to 160 calories for yogurt. Yogurt ranges from a low of 100 calories to a high of 200 calories, a range of 100 calories, compared to ice cream which ranges from 150 calories to over 300 calories, a range of 150 calories.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Calories per Serving	
Ice Cream	Yogurt
100	120
150	125
180	125
250	125
255	130
260	135
275	135
275	140
275	140
300	150
300	150
310	155
325	155
325	160
325	170
325	180
340	190
340	250

DATA-GRAPH-SUMMARY MATCH ACTIVITY

The data represent the number of calories in a serving of different brands of ice cream and yogurt. The graph illustrates that ice cream generally has more calories. Seventy-five percent of the ice cream brands have more than 250 calories. In contrast, seventy-five percent of the yogurt brands is below 170 calories. Furthermore, the median number of calories for yogurt is approximately 150 calories compared to nearly 300 calories for ice cream. We can also see from the graph that ice cream brands have more variation in calories than yogurt.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Ice Cream Versus Yogurt - Calories Per Serving

Ice Cream	Yogurt
0	10
	11
	0, 5, 5,
	5
	12
	0, 5, 5
	13
	0, 0
	14
	0, 0, 5,
0	15
	5
	16
	0
	17
	0
0	18
	0
	19
	0
	20
	21
	22
	23
	24
5, 0	25
0	0
	26
5, 5, 5	27
	28
	29
0, 0	30
0	31
5, 5, 5,	
5	32
	33
0, 0	34

Key: 5| 21 = 215
 21| 0 = 210

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Calories per Serving	
Ice Cream	Yogurt
220	100
220	100
240	100
240	120
250	140
250	140
260	150
260	150
270	160
270	170
300	170
300	170
300	170
300	180
345	185
345	185
350	190
350	200

DATA-GRAPH-SUMMARY MATCH ACTIVITY

The data represent the number of calories in a serving of different brands of ice cream and yogurt. The graph illustrates that ice cream generally has more calories. In fact, all of the brands of ice cream examined have higher calories than all of the brands of yogurt selected. The maximum number of calories for yogurt is 200 calories compared to the minimum number of calories for ice cream is 220 calories. Furthermore, the median number of calories for ice cream is approximately 270 calories compared to 170 calories for yogurt. Both ice cream and yogurt have similar ranges and variation. Yogurt's range is approximately 100 calories. Similarly, ice cream's range is about 125 calories.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Ice Cream Versus Yogurt - Calories Per Serving

Ice Cream	Yogurt
	10
	11
	12
	13
	14
	15
	16
	17
	18
	19
	20
	21
0, 0	22
	23
0, 0	24
0, 0	25
0, 0	26
0, 0	27
	28
	29
0, 0, 0, 0	30
	31
	32
	33
5, 5	34
0, 0	35

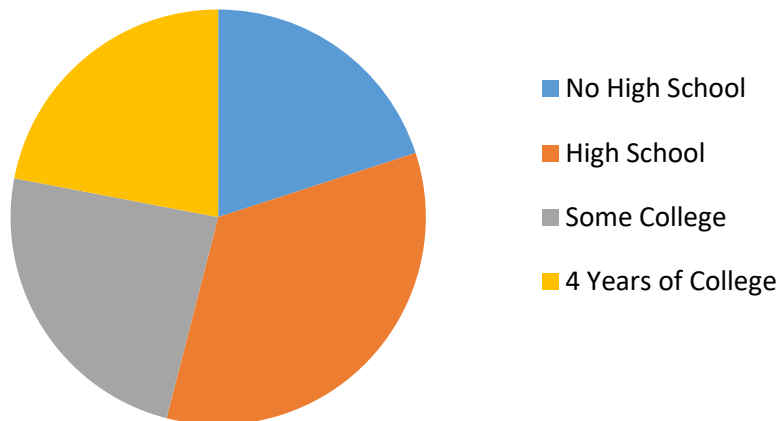
Key: 5| 21 = 215
21| 0 = 210

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Years of Schooling	Percent
No High School	20
High School	34
Some College	24
4 Years of College	22

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Years of Schooling Completed by Adults
Age 25 yrs or older



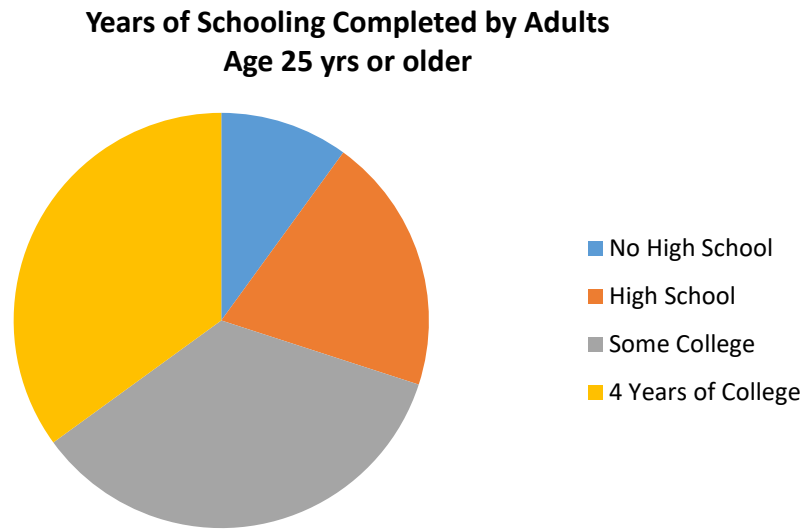
DATA-GRAPH-SUMMARY MATCH ACTIVITY

The data represent the percent of adults, age 25 and older, who have completed a certain level of schooling. Based on the graph, it appears that nearly equal percentages completed no high school, some college, and four years of college. The largest percentage was those adults who completed high school only.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Years of Schooling	Percent
No High School	10
High School	20
Some College	35
4 Years of College	35

DATA-GRAPH-SUMMARY MATCH ACTIVITY



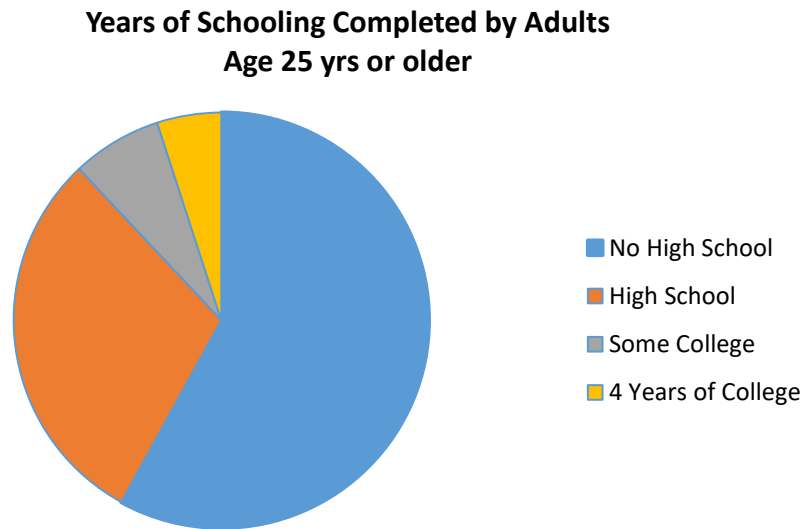
DATA-GRAPH-SUMMARY MATCH ACTIVITY

The data represent the percent of adults, age 25 and older, who have completed a certain level of schooling. Based on the graph, it appears that this population is fairly well educated with approximately 70 percent completing at least some college. Those completing no high school made up the smallest percentage at only 10 percent of the population.

DATA-GRAPH-SUMMARY MATCH ACTIVITY

Years of Schooling	Percent
No High School	58
High School	30
Some College	7
4 Years of College	5

DATA-GRAPH-SUMMARY MATCH ACTIVITY



DATA-GRAPH-SUMMARY MATCH ACTIVITY

AR Remediation Plan – Data Representation and Interpretation

The data represent the percent of adults, age 25 and older, who have completed a certain level of schooling. Based on the graph, it appears that the majority of this population has not completed high school. Those with some college and/or 4 years make up less than 15% of the entire population. These facts suggest that the population is not well educated.
