Pick The

Review Warm up

Think scatterplot when you see this

2. Python eggs How is the hatching of water python eggs influenced by the temperature of the snake's nest? Researchers randomly assigned newly laid eggs to one of three water temperatures: hot, neutral, or cold. Hot duplicates the extra warmth provided by the mother python, and cold duplicates the absence of the mother. The two-way table summarizes the data on whether or not the eggs hatched.

		Water temperature			
		Cold	Neutral	Hot	Total
Hatched?	Yes	16	38	75	129
	No	11	18	29	58
	Total	27	56	104	187

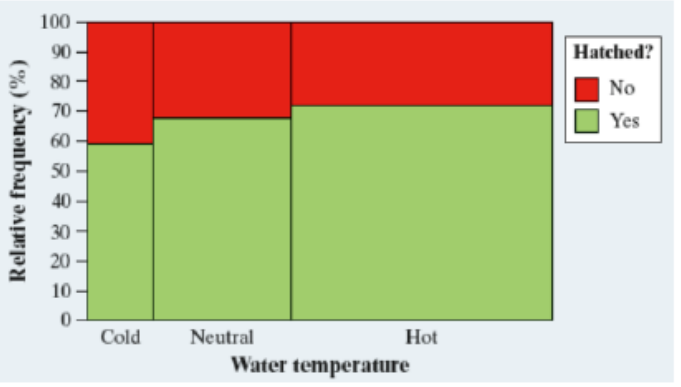
(a) Of the eggs that hatched, what proportion were randomly assigned to hot water?

Seventy-five of the 129 eggs that hatched, or a proportion of 0.581, were randomly assigned to hot water.

(b) Of the eggs that were randomly assigned to hot water, what percent hatched?

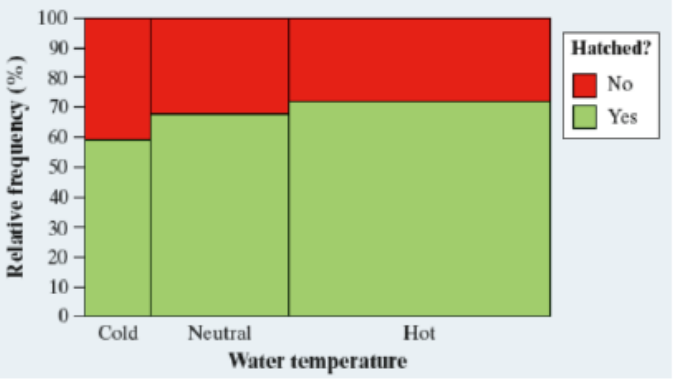
Seventy-five of the 104 eggs that were assigned to hot water, or 72.1%, hatched

(c) The mosaic plot displays the distribution of hatching status by water temperature. Describe what this graph reveals about the association between these two variables for the python eggs in this experiment.



Based on the mosaic plot, there is an association between water temp and whether the eggs hatched or not

(c) The mosaic plot displays the distribution of hatching status by water temperature. Describe what this graph reveals about the association between these two variables for the python eggs in this experiment.



Based on the mosaic plot there is an association between water temp and whether the eggs hatched or not

The python eggs were least likely to hatch in cold water (59.3%) and most likely to hatch in hot water (72.1%) so the chance of hatching increased as water temp increased.

Ch 3 (& part of 12) Describing Relationships

2 days 3.1
4 days 3.2
2 days 12.2
1 day Review
1 day Ch.3+12 TEST ← Wed. Oct. 9

today

3.1 day 1

Distinguish between explanatory & response variables for quantitative data.

today

3.1 day 1

Distinguish between explanatory & response variables for quantitative data.

Make a scatter plot to display the relationship between two quantitative variables

today

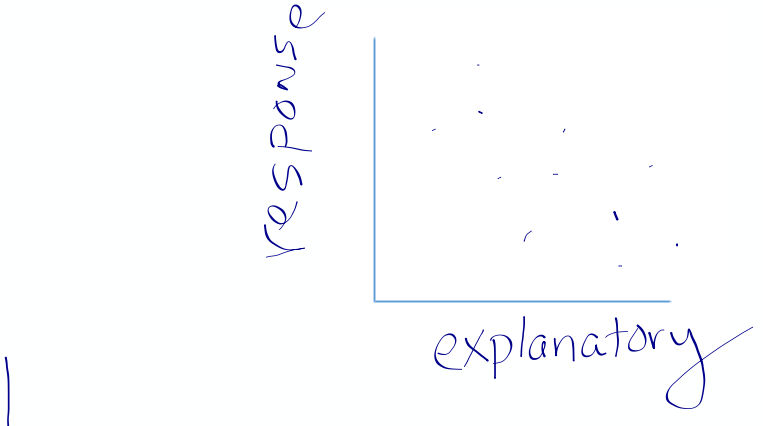
3.1 day 1

Distinguish between explanatory & response variables for quantitative data.

Describe the direction, form, and strength of a relationship displayed in a scatterplot

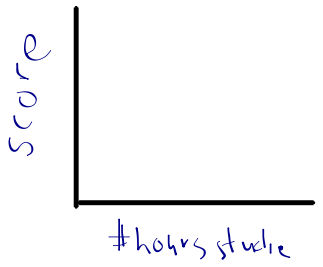
Make a scatterplot to display the relationship between two quantitative variables

A **response variable** measures an outcome of a study.
An **explanatory variable** may help predict or explain changes in a response variable.

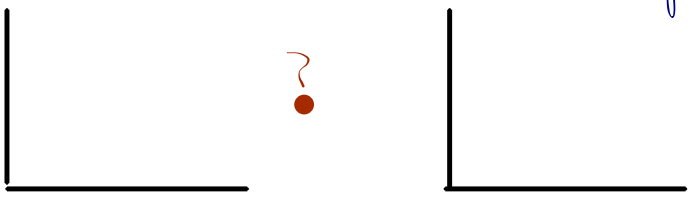


Identify the explanatory variable and response variable for the following relationships, if possible. Explain your reasoning.

(a) The score on a statistics final exam and the number of hours studied for a sample of students

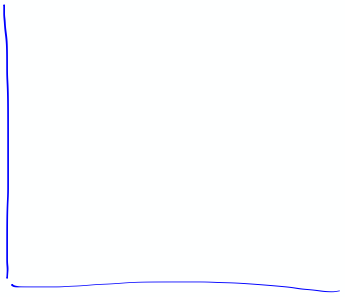


(b) The final exam score for statistics and the final exam score for biology for a sample of students taking both courses

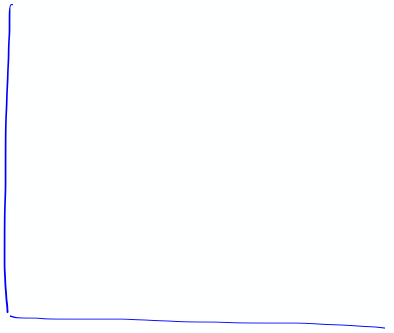


no special order

A variable should have values that are capable of varying.



Sugar



Amount of Sugar (g)

You probably heard about Mickey Mouse.....

3.1-Day 1

How many rubber bands does Mickey need?

Everyone knows that Mickey Mouse is a thrill seeker and likes to gamble. He carries a bag of six-sided dice around wherever he goes, even when he bungie jumps. Can you believe it? How many rubber bands should we attach to Mickey (and his bag of dice) so that he has the absolute most fun without smashing his head if he were to jump from the old slide projector screen to the floor. (2.4 meters above the ground)? Here's the catch: You many only use 7 rubber bands to figure this out.

Complete the table:

# Rubber bands		2	3	4	5	6	7	
Distance traveled		41	71	96	127	161		

Use your group's data to complete the following:

1. Identify the explanatory and response variables.

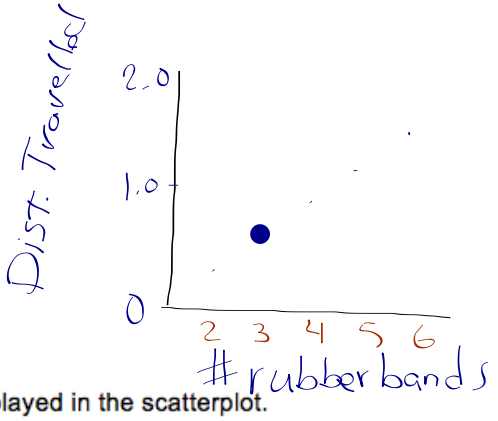
Used to predict (Input) #rubber bands

outcome of study (output) dist. travelled

2. How many variables do we have? Are they categorical or quantitative?

2 quantitave variables

3. Use the applet at www.stapplet.com to make a scatterplot. Draw and label below.



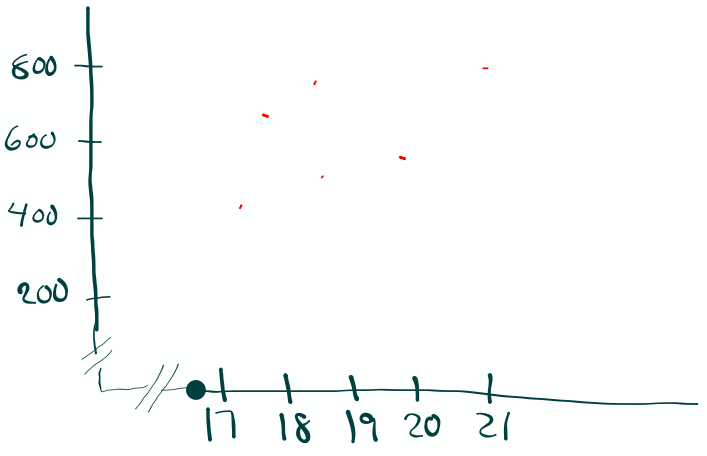
4. Describe the relationship displayed in the scatterplot.

rubber bands associates with the dist. travelled.

When # rubber bands ↑, the dist. ↑

positive correl.

If (0,0) is not the bottom left point ..



Displaying Relationships: Scatterplots

Big Ideas:

Displaying Relationships: Scatterplots

Big Ideas:

Explanatory

Response

Displaying Relationships: Scatterplots

Big Ideas:

Explanatory
- used to predict

Response - outcome
- responds to explanatory

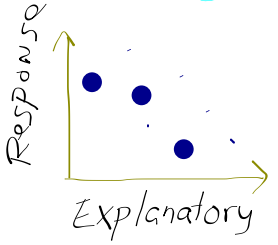
Displaying Relationships: Scatterplots

Big Ideas:

Explanatory
- used to predict

Response - outcome
- responds to explanatory

Desribe



Woo-hoo!
Duff

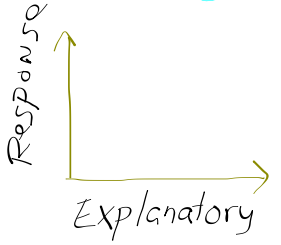
Displaying Relationships: Scatterplots

Big Ideas:

Explanatory
- used to predict

Response - outcome
- responds to explanatory

Desribe



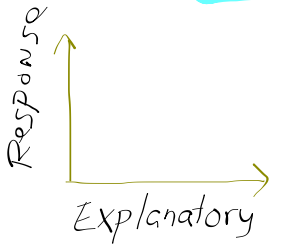
D
U
F
S

Displaying Relationships: Scatterplots

Big Ideas:

Explanatory
- used to predict

Response - outcome
- responds to explanatory



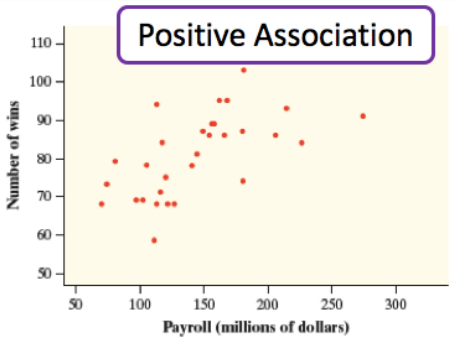
Describe

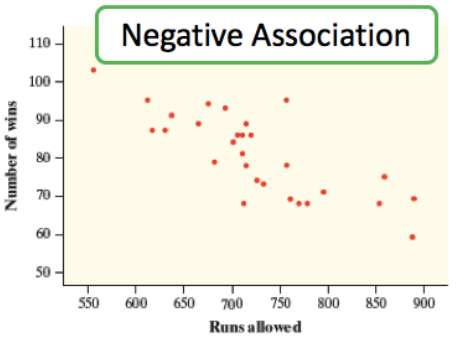
Direction (+/- /none)

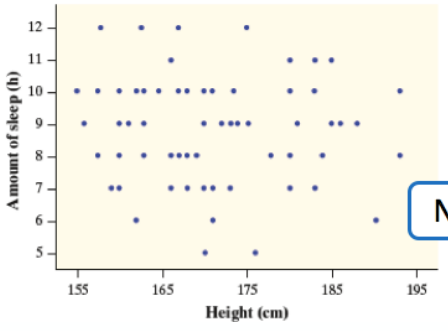
U

F

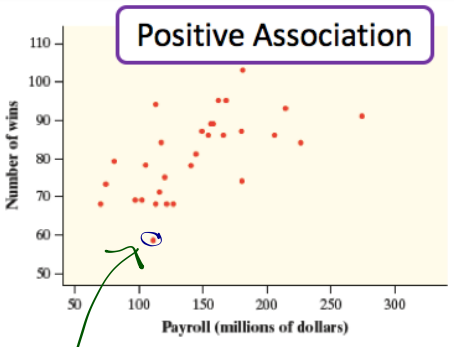
S

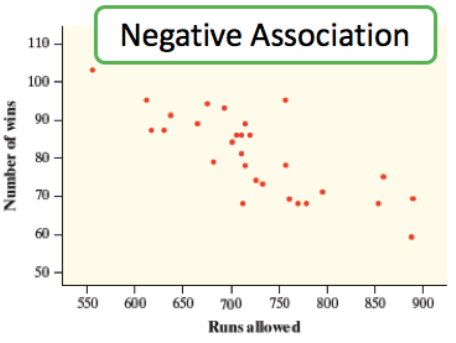


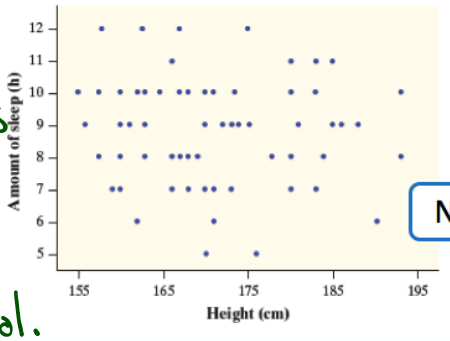




No Association







No Association

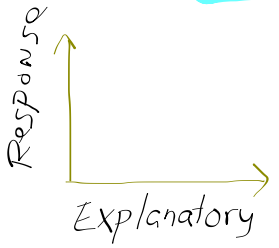
if two individuals have identical values, you can use a different symbol.

Displaying Relationships: Scatterplots

Big Ideas:

Explanatory
- used to predict

Response - outcome
- responds to explanatory



Describe

Direction (+/- /none)

Unusual features < clusters / outliers

F

S

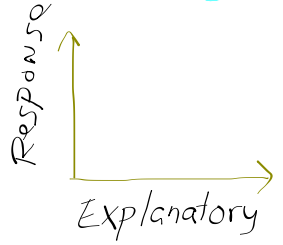
not an outlier
outlier

Displaying Relationships: Scatterplots

Big Ideas:

Explanatory
- Used to predict

Response - outcome
- responds to explanatory



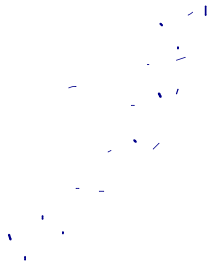
Describe

Direction (+/- /none)

Unusual features (clusters / outliers)

Form (linear / non-linear)

S

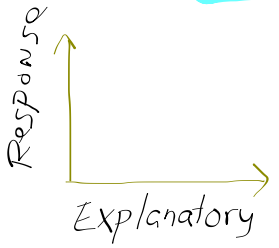


Displaying Relationships: Scatterplots

Big Ideas:

Explanatory
- used to predict

Response - outcome
- responds to explanatory



Describe

Direction (+/- /none)

Unusual features <clusters <outliers

Form (linear /non-linear)

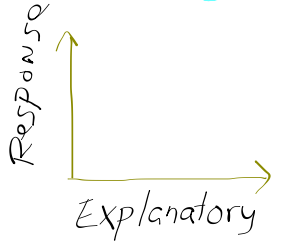
Strength

Displaying Relationships: Scatterplots

Big Ideas:

Explanatory
- Used to predict

Response - outcome
- responds to explanatory



Describe

Direction (+/- /none)

Unusual features <clusters <outliers

Form (linear /non-linear)

Strength

Strength: A scatterplot can show a weak, moderate, or strong association. An association is strong if the points don't deviate much from the form identified. An association is weak if the points deviate quite a bit from the form identified.

How to Describe a Scatterplot

To describe a scatterplot, make sure to address the following fo
characteristics in the context of the data:

- **Direction:** A scat

CAUTION:

When ***describing*** the association shown in a scatterplot, write ***in the context of the problem***.

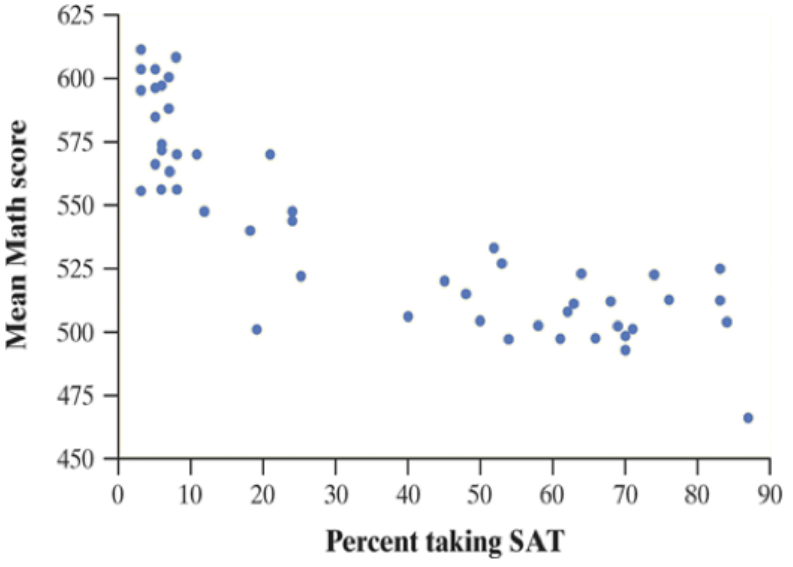
This means that you need to use both variable names in your description.

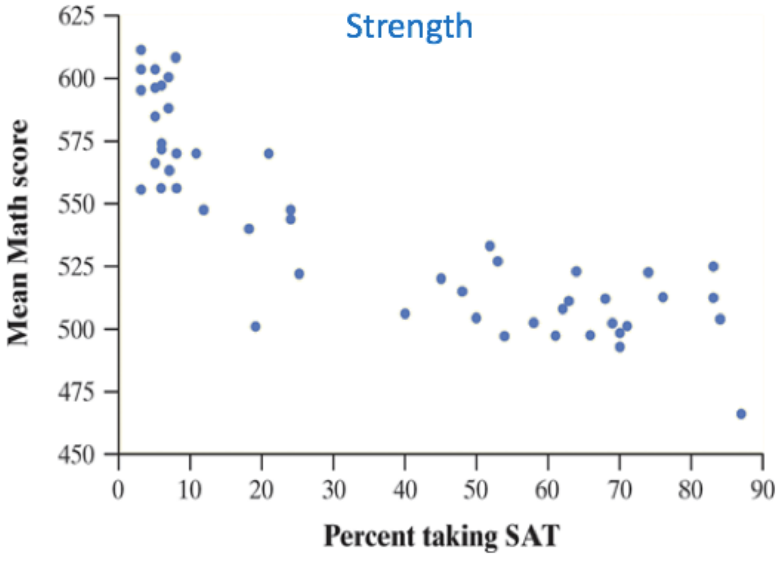
- ... quite a bit from the
- ... **features:** Look for outliers that fall outside the overall pattern and distinct clusters of points.

Example

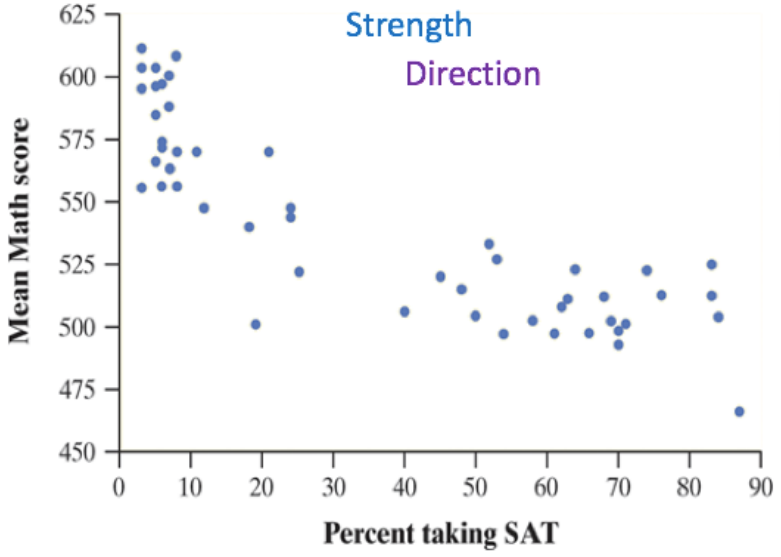
Just Watch

The scatterplot shows the association between mean SAT Math score and percent of students who take the SAT for the 50 U.S. states. Describe the association shown by the scatterplot.

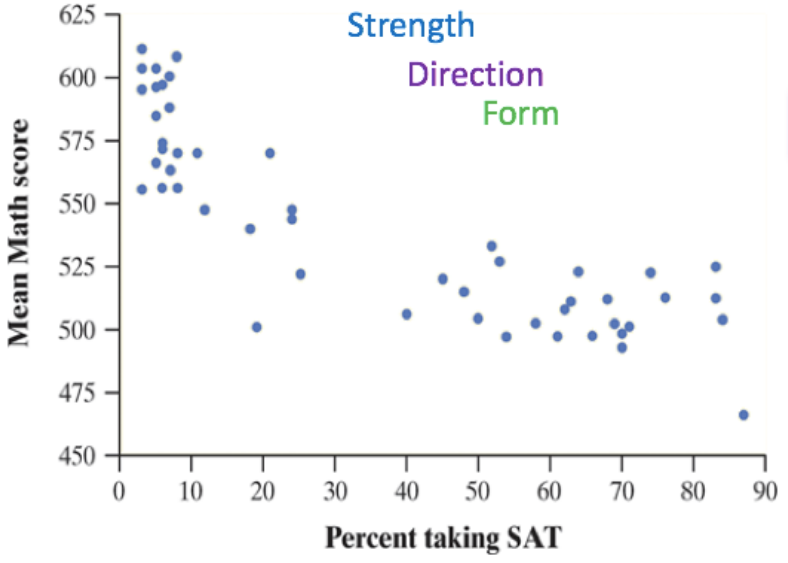




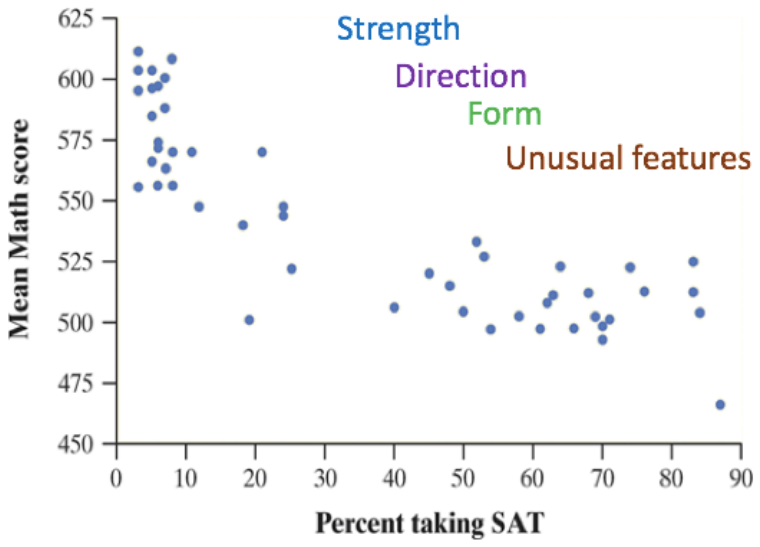
There is a moderately strong, negative, curved relationship between the percent of students in a state who take the SAT and the mean SAT math score.
Further, there are two distinct clusters of states and two possible outliers that fall outside the overall pattern.



There is a moderately strong, negative, curved relationship between the percent of students in a state who take the SAT and the mean SAT math score.
Further, there are two distinct clusters of states and two possible outliers that fall outside the overall pattern.



There is a moderately strong, negative, curved relationship between the percent of students in a state who take the SAT and the mean SAT math score.
Further, there are two distinct clusters of states and two possible outliers that fall outside the overall pattern.



There is a moderately strong, negative, curved relationship between the percent of students in a state who take the SAT and the mean SAT math score.

Further, there are two distinct clusters of states and two possible outliers that fall outside the overall pattern.

Check Your Understanding:

1. Is there a relationship between the amount of sugar (in grams) and the number of calories in movie-theater candy? Here are the data from a sample of 12 types of candy.

Name	Sugar (g)	Calories	Name	Sugar (g)	Calories
Butterfinger Minis	45	450	Reese's Pieces	61	580
Junior Mints	107	570	Skittles	87	450
M&M'S®	62	480	Sour Patch Kids	92	490
Milk Duds	44	370	SweeTarts	136	680
Peanut M&M'S®	79	790	Twizzlers	59	460
Raisinets	60	420	Whoppers	48	350

a. Identify the explanatory and response variables. Explain your reasoning.

Amount Sugar is explanatory and calories are the response.

If you add sugar, the calories go up.

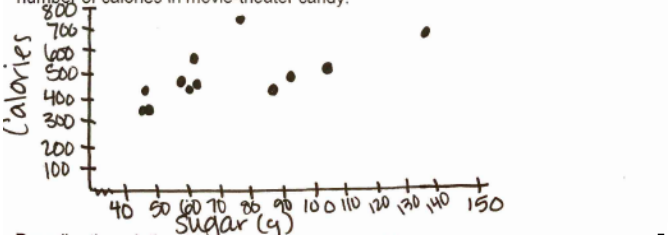
b. Make a scatterplot to display the relationship between amount of sugar and the number of calories in movie-theater candy.

c. Describe the relationship shown in the scatterplot.

There is a positive, weak association b/w the amount of sugar in movie-theater candy & the # of cal. There are some clusters. The graph is moderately linear.

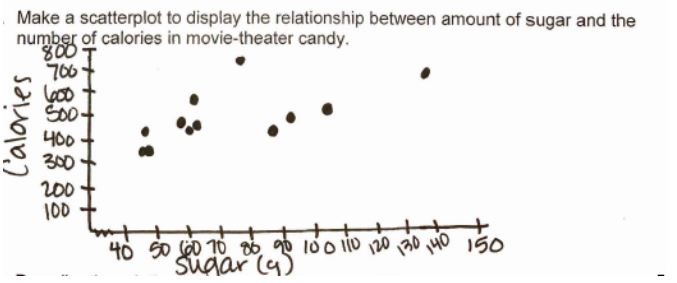
b. Make a scatterplot to display the relationship between amount of sugar and the number of calories in movie-theater candy.

Make a scatterplot to display the relationship between amount of sugar and the number of calories in movie-theater candy.



c. Describe the relationship shown in the scatterplot.

b. Make a scatterplot to display the relationship between amount of sugar and the number of calories in movie-theater candy.

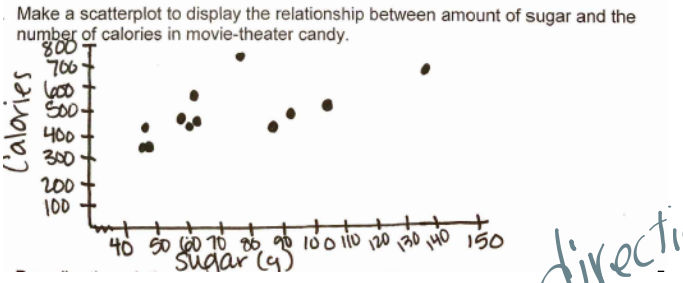


c. Describe the relationship shown in the scatterplot.

The scatterplot shows a positive, fairly strong linear pattern.

There is a possible outlier with peanut M&M's at (79,790)

b. Make a scatterplot to display the relationship between amount of sugar and the number of calories in movie-theater candy.



strength

direction

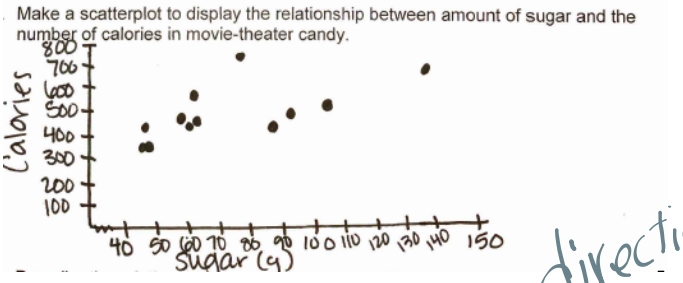
c. Describe the relationship shown in the scatterplot.

The scatterplot shows a positive, fairly strong linear pattern.

There is a possible outlier with peanut M&M's at (79,790)

unusual

b. Make a scatterplot to display the relationship between amount of sugar and the number of calories in movie-theater candy.



strength

c. Describe the relationship shown in the scatterplot.

Form

direction

The scatterplot shows a positive, fairly strong linear pattern.

There is a possible outlier with peanut M&M's at (79,790)

unusual

Assignment :

3.1..... 1, 3, 5, 9, 11 and p.80....128

study pp. 153-159