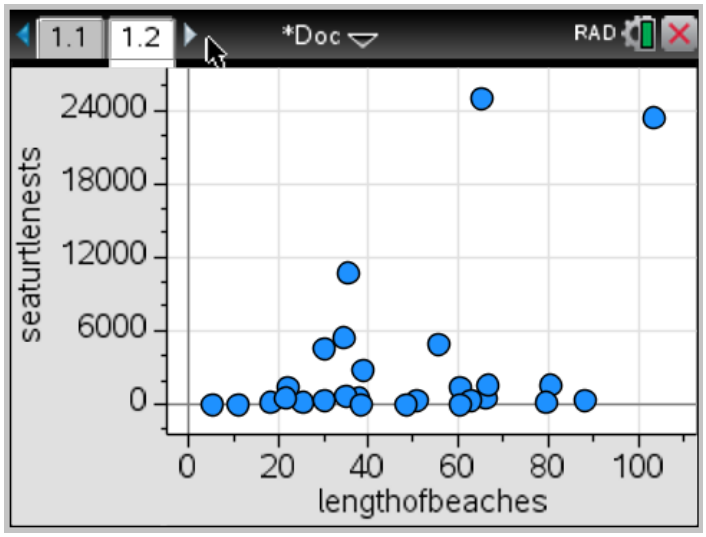
Name:_____

SEA TURTLE NESTS VS. …

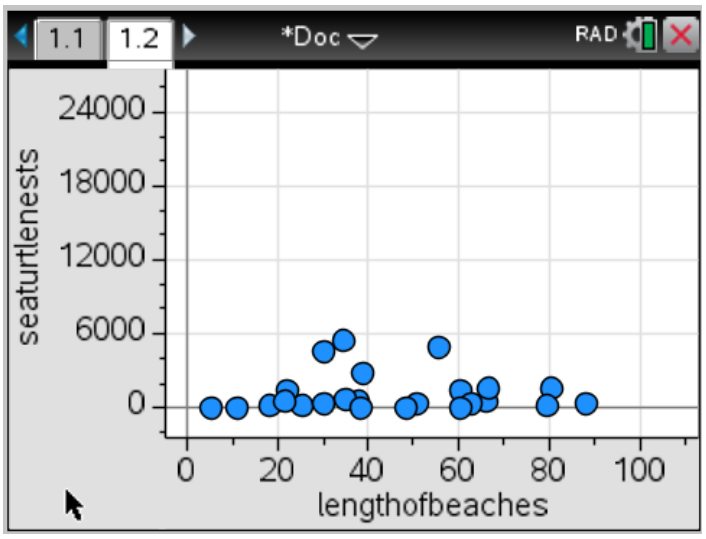
#1: Many factors influence the number of sea turtle nests on a beach. Do you think the length of the beach surveyed has an effect on the number of sea turtle nests observed?

- Use a graphing utility to create a scatterplot, plotting the number of sea turtle nests observed per county (y) vs. the total kilometers of beach surveyed per county (x).

Scatterplot, r = 0.38



Scatterplot with 3 previously determined outliers removed, r = 0.01



Follow Up

- Does there appear to be any correlation? Explain your answer.

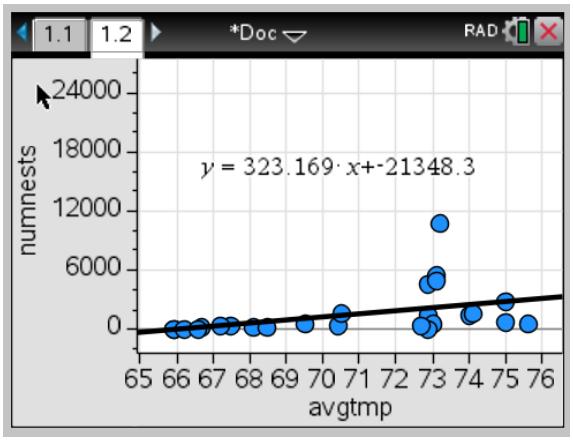
No, the data points do not appear to have a trend line.

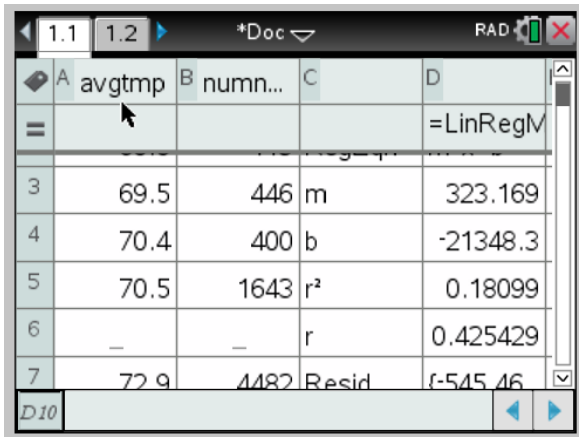
- What is the value or Pearson's correlation coefficient and what does it tell you?
  $r = 0.01$; *There is no correlation between the length of beach surveyed and the number of nests observed.*
- Is this variable worth investigating further, why or why not?

  No, because the correlation is not strong enough to examine any causal link.

#2: Do you think the average air temperature during nesting season has an effect on the number of nests observed?

- Use the temperature data and graphing utility to create a scatterplot plotting the number of sea turtle nests observed per county (y) vs. the average temperature per county (x).





Follow Up

- Does there appear to be any correlation? Explain your answer.

  No, the scatterplot, even with the outliers removed, does not appear to be a good line of fit.
- What is the value or Pearson's correlation coefficient and what does it tell you?

  $r = 0.43$; *This tells us that there is a moderate correlation.*
- Is this variable worth investigating further, why or why not?

  No, the correlation coefficient does not indicate that there is a correlation worth investigating.

What other factors do you think would be worth investigating? Explain your reasoning.

Answers vary: Beach development and or lighting, hurricane activity, currents, beach grade

SEA TURTLE NESTS VS. …

	County	Number of Statewide Loggerhead Nests 2014	Length of Statewide Nesting Beach (km)	County Average Temperature (°F)
Atlantic Coast	Nassau	114	18.2	68.1
	Duval	119	25.4	68.5
	St. Johns	446	66.3	69.5
	Flagler	400	30	70.4
	Volusia	1643	80.5	70.5
	Brevard	23457	103.2	72.2
	Indian River	4482	30	72.9
	St. Lucie	5440	34.5	73.1
	Martin	10805	35.3	73.2
	Palm Beach	24951	65	74.2
	Broward	2878	38.6	75.0
	Miami-Dade	485	37.9	75.6
Gulf West Coast	Monroe	600	34.8	75.0
	Collier	1376	60.6	74.0
	Lee	1509	66.4	74.1
	Charlotte	1323	22.2	72.9
	Sarasota	4884	55.8	73.1
	Manatee	539	21.7	73.0
	Hillsborough	47	5.1	72.9
	Pinellas	363	62.6	72.7
Gulf Panhandle	Franklin	415	88.2	67.5
	Gulf	328	50.6	67.2
	Bay	105	79.7	66.7
	Walton	60	48.4	65.9
	Okaloosa	34	38.2	65.9
	Santa Rosa	12	11.2	66.2
	Escambia	55	60.4	66.6
		86870	1270.8	

Name:_____

Sea Turtle Nesting Basics

Each morning from March 1 to October 31, the research team from the Loggerhead Marinelife Center uses ATVs to survey 9.5 miles of coastline from the Palm Beach County line south to MacArthur Beach State Park looking for new turtle crawls. When a new crawl is discovered, detailed notes, including where on the beach the crawl is located and any obstructions that the turtle encounters, are taken. GPS point of the crawl is also taken. In order to study the reproductive success of the nests, a statistically significant portion of the nests are marked with wooden stakes. These "marked nests" are checked every day throughout incubation. Once the nest hatches (noted by the hatchling tracks coming from the nest), an inventory the contents of the nest is taken to see how many hatched and unhatched eggs there are in the nest.

-Loggerhead Marinelife Center

The following terms are used in the data that you will be analyzing:

- **Beach escarpment** – An area on the beach where elevation changes suddenly due to sand erosion.
- **Crawl** – Tracks and other sign left on a beach by a sea turtle.
- **False Crawl** – A crawl resulting from an abandoned nesting attempt (a non-nesting crawl).
- **Nest** – A crawl resulting from a nesting attempt in which eggs were deposited.
- **Nesting success** – Percentage found by the number of nests divided by the number of crawls.

Definitions adapted from: http://myfwc.com/media/3055670/crawlidentificationguidelines.pdf

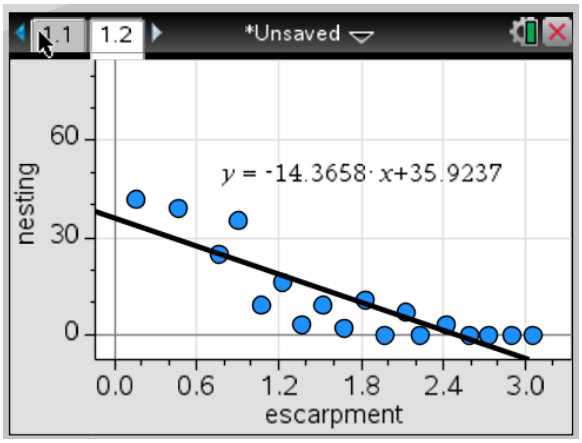
The data shown in the table below gives the number and types of crawls, as well as the height of beach escarpments for each type from April 29, 2010 through September 4, 2015.

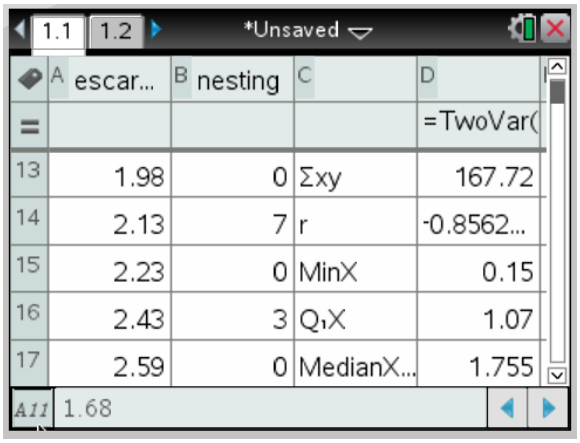
Escarpment Height (meters)	Number of False Crawls	Number of Nests	Total Number of Crawls	Nesting Success Percentage (%)
0.15	48	42	*90*	*47*
0.30	105	76	*181*	*42*
0.46	66	39	*105*	*37*
0.61	102	77	*179*	*43*
0.76	41	25	*66*	*38*
02.91	74	35	*109*	*32*
1.1107	28	9	*37*	*24*
1.22	37	16	*53*	*30*
1.37	16	3	*19*	*16*
1.52	35	9	*44*	*20*
1.68	8	2	*10*	*20*
1.83	45	11	*56*	*20*
1.98	1	0	*1*	*0*
2.13	19	7	*26*	*27*
2.23	0	0	*0*	*0*
2.43	18	3	*21*	*14*
2.59	0	0	*0*	*0*
2.74	2	0	*2*	*0*
2.90	0	0	*0*	*0*
3.05	4	0	*4*	*0*
Totals	*649*	*354*	*1003*	

Complete the table by finding the nesting success for each escarpment height.

#3: Do you think the height of an escarpment affects the likelihood a turtle will nest?

- Use the escarpment data from the chart you completed and a graphing utility to create a scatterplot graphing the nesting success percentage (y) vs. the height of the escarpment (x).





Follow Up

- Does there appear to be any correlation? Explain your answer.
  Yes, the data in scatterplot has a negative correlation.

- What is the value or Pearson's correlation coefficient and what does it tell you?
  $r = -0.8$ with the two outliers in the data set and $r = -0.86$ with the two outliers removed. There is a strong negative correlation; that is, as the escarpment gets higher the nesting success gets lower.

- Write the equation for the line of best fit.
  $y = -14.37x + 35.92$

- Make the following predictions for the likelihood of nesting success, given there is
  - a 0.23 meter escarpment;
    $y = -14.37(0.23) + 35.92 = 32.6\%$
  - a 1.42 meter escarpment;
    $y = -14.37(1.42) + 35.92 = 15.5\%$
  - a 2.21 meter escarpment.
    $y = -14.37(2.21) + 35.92 = 4.2\%$