Please open the Desmos Calculator as well as the SBAC High School Calculator. We will show you how to use them in a bit. You may also want to add the tab scissors and tab glue chrome extensions to your Chrome browser to make navigation easier for this activity.

For each problem below, find the linear functions that best models the data. Record the linear function on this document, and use the function to answer the questions. Please show all work on this document.

Femur length (cm)	Height (cm)
50.1	178.5
48.3	173.6
45.2	164.8
44.7	163.7
44.5	168.3
42.7	165.0
39.5	155.4
38.0	155.8

Link to data

1. What is the regression equation? Write in the form $y = ax + b$. Write a sentence to explain your equation.

2. An anthropologist finds a femur length of 58 cm. How tall was the person?

High temperature (°F)	Number of cans sold
55	340
58	335
64	410
68	460
70	450
75	610
80	735
84	780

Link to data

3. What is the regression equation? Write in the form $y = ax + b$. Write a sentence to explain your equation.

4. Use the model to predict soft-drink sales if the temperature is $95° F$.

5. Use the model to predict the high temperature if 1000 cans of soda were sold.

Diameter (in.)	Age (years)
2.5	15
4.0	24
6.0	32
8.0	56
9.0	49
9.5	76
12.5	90
15.5	89

Link to data

6. What is the regression equation? Write in the form $y = ax + b$. Write a sentence to explain your equation.

7. Use the model to estimate the age of an oak whose diameter is 18 in.

Temperature (°F)	Chirping rate (chirps/min)
50	20
55	46
60	79
65	91
70	113
75	140
80	173
85	198
90	211

Link to data

8. What is the regression equation? Write in the form $y = ax + b$. Write a sentence to explain your equation.

9. Use the model to predict the temperature if the chirping rate was 250 chirps per minute.

10. Use the model to estimate the chirping rate at $100°F$.

Year	CO$_2$ level (ppm)
1984	344.3
1986	347.0
1988	351.3
1990	354.0
1992	356.3
1994	358.9
1996	362.7
1998	366.5
2000	369.4

Link to data

11. What is the regression equation? Write in the form $y = ax + b$. Write a sentence to explain your equation.

12. Use the linear model to estimate the CO_2 level in the atmosphere in 2001. How does this compare to the actual CO_2 level of 371.1 measured in 2001?

Income	Ulcer rate
$4,000	14.1
$6,000	13.0
$8,000	13.4
$12,000	12.4
$16,000	12.0
$20,000	12.5
$30,000	10.5
$45,000	9.4
$60,000	8.2

Link to data

13. What is the regression equation? Write in the form $y = ax + b$. Write a sentence to explain your equation.

14. Estimate the peptic ulcer rate for an income level of $25,000 according to the linear model.

15. Estimate the peptic ulcer rate for an income level of $80,000 according to the linear model.

Noise level (dB)	MRT score (%)
80	99
84	91
88	84
92	70
96	47
100	23
104	11

Link to data

16. What is the regression equation? Write in the form $y = ax + b$. Write a sentence to explain your equation.

17. Find the correlation coefficient. Is a linear model appropriate?

18. Use the linear model to estimate the intelligibility of a sentence at a 94-dB noise level.

Year	Life expectancy
1920	54.1
1930	59.7
1940	62.9
1950	68.2
1960	69.7
1970	70.8
1980	73.7
1990	75.4
2000	76.9

Link to data

19. What is the regression equation? Write in the form $y = ax + b$. Write a sentence to explain your equation.

20. Use the linear model to predict the life expectancy in the year 2004.

21. Search the Internet to find the actual 2004 average life expectancy. Compare to your answer in problem 18.

22. What will the estimated life expectancy be in 2050 according to this model?