**Building a Prototype to Understand Stress in Teens**

* Is there a significant relationship between heart rate and body temperature?
* How does stress effect the heart rate and body temperature?
* How can wearable devices (Nanotechnology) be used to detect stress in a teenager?

**Brief Introduction about the data**

*A study was conducted consisting of 107 healthy males and females, total. The purpose of the study was to determine whether higher body temperatures produce higher heartbeats, and vice versa for low body temperatures and low heartbeats.*

*This study will deepen your understanding of the relationship between heart rate and temperature. This investigation is designed to spark the interest of students in areas that lead to the research, development, and analysis for more effective prototypes that could detect the stress levels in teens as well as other healthcare issues in society.*

**Instructions:**

* Click on the link to access data on body temperature and heart rate: [Temperature vs. Heart Rate](https://docs.google.com/spreadsheets/d/1Po63qnu2TpdF9SxDW0mF8iRFBnfWjFkPU4E9wpaVRMc/pub?output=ods)
* Download “Geogebra” and copy and paste data into a spreadsheet on this app.
* Use the tools to create a scatter plot, a regression equation, and much more to be able to analyze the data.

**Analysis of data and Research**

1. Describe the relationship between the temperature of the body and the heart rate.
2. Determine a regression equation for the data.
3. Interpret the rate of change of the data. Does the rate of change make sense in context to the situation and reality justify your answer?
4. Interpret the y-intercept in context to the situation. Is the numerical value for the y-intercept reasonable for this situation? Explain your rationale.
5. Determine the correlation coefficient () and the coefficient of determination (). Use these values to explain the relationship between the body temp and heart rate.
6. What predictions can you make using the regression equations? Would these predictions make sense if this simulation was repeated when taking a test, playing a competitive game such as on the X-box or a sports etc.
7. Create residual plot for the data. What does the plot suggest?
8. Statistics: How can a histogram, bar graphs, and statistics be used to make further analysis about the data? (Create a histogram, bar graphs, and a statistical table and write brief about the data and interpretations of data from this perspective)
9. What are some underlying factors that could affect the accuracy of the data collected from this survey?
10. What data collection instruments should be considered when trying to collect this data?
11. What data collection instruments should be considered when trying to collect data from your body as it relates to stress?