Pratik Gandhi, Mr. Thomas (Tom) Weiderman
GK-12: AP Statistics at Gardner High School

Summary:
Since students were going to learning about mean, variance, standard deviation and z-score, Mr. Weiderman and I thought it would be better to talk about normal distribution. So I used a MATLAB model that I had it from last year, in which they can plot multiple Gaussian curves as they change mean and standard deviation. I also had some exercise, where they had to put some z-score value and MATLAB draws a line to that corresponding point. I explained them how to z-score is derived and how it is used. It was a fun exercise, since they understood the concept of mean, std, variance, and z-score. I also explained them the importance of Gaussian curve in my research. I also showed them that the distribution of white noise can be considered as Gaussian.
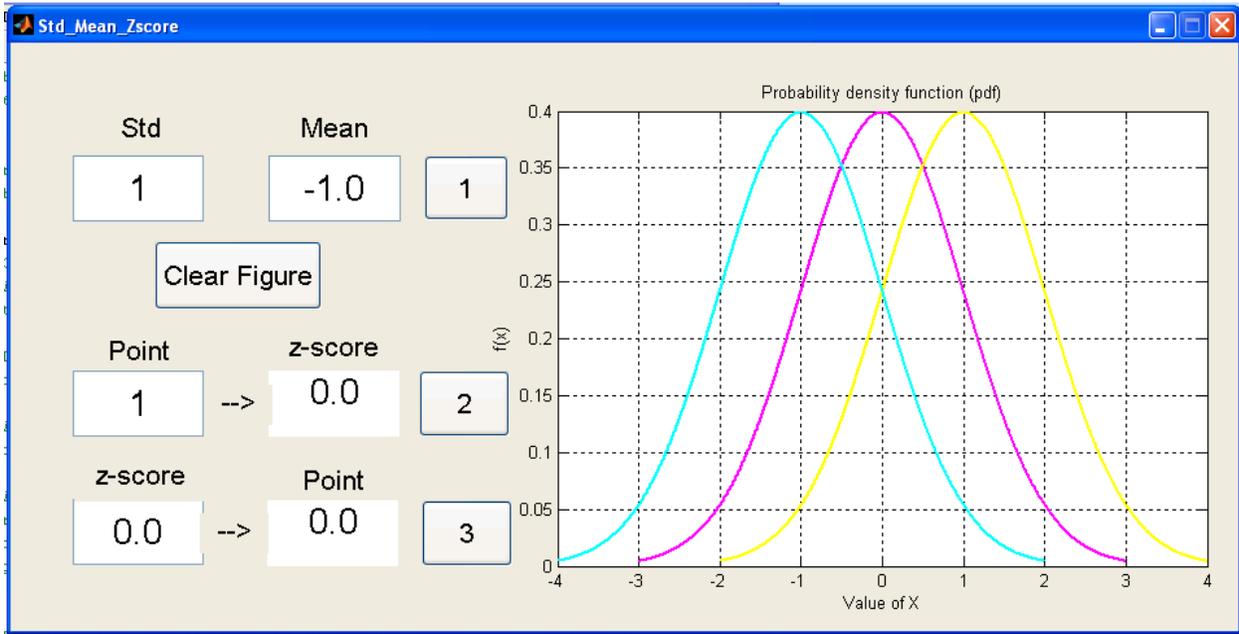
Period: **Class: Normal Distribution**
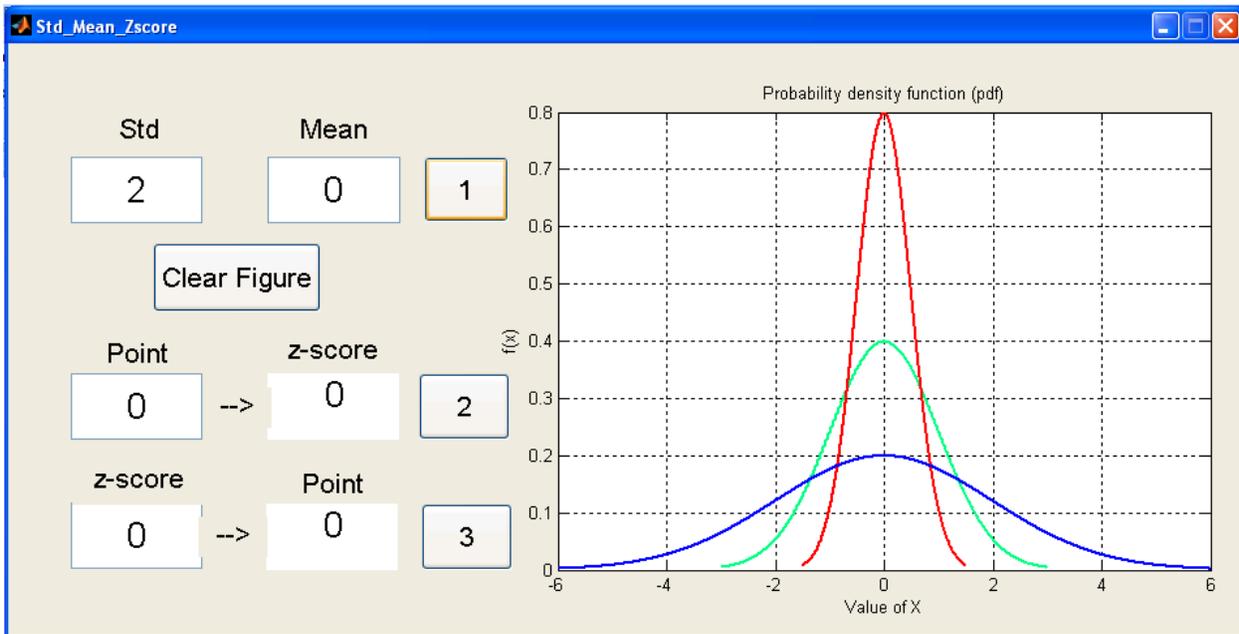**Date(s): September 27th, 2012**

SETTING THE STAGE	
Essential Question	What makes millions of people around the world to talk to each other on cell phones
Content Objective(s) (Student-friendly)	We should be able to understand Normal Distribution.
Connection to previous or future lessons	Can lead to correlation and linear regression
Critical Thinking Questions	What is normal distribution? How does it play a role in wireless communication?
Key Vocabulary	Mean, variance, z-score
Materials Needed/Safety	Computers, MATLAB

ACTIVE INSTRUCTION	
• Launch (Engage)	Discuss about generating normal distribution. Teach them about the histogram, how generate one using MATLAB. Define mean and variance, and how they are used. Launch the MATLAB GUI program, Std_Mean_Zscore.m, and using it as demo to let them know how mean and variance affect the distribution. How the z-score is related to normal distribution. Explain them about Gaussian distribution and how the noise is considered as part of it. Generate a bunch of normal distributed numbers and use the sound command to generate noise.
• Investigation (Explore)	How is the distribution affected by changing the mean and the variance? What does the z-score tell you? How to look up the table for the z-score?
TIME FOR REFLECTION	
• Summarization (Explain & Extend)	Summarize them all the definition related to the normal distribution such as mean, variance, and z-score. Also discuss the importance of using software such as MATLAB to do simulation in short time.
• Assessment (Evaluate)	Ask them to write or discuss about what they learned about normal distribution.
• Homework	None

(1) Change in mean

(2) Change in standard deviation (std)

(3) Understanding z-score