GK-12 Lesson Plan

Teacher:

Poisson

Lesson Summary:

The lesson began with an attempt at showing a live video feed of a highway located in Maryland. This was a complete bust as the school's internet could not even load the video stream. I then had to use a recording program (FRAPS) to record a five minute period of the live stream and bring this in on a USB and play it from there. The lesson began with the video being put on the large TV screen and an explanation of what it meant. A small discussion was had regarding what the average car rate in a lane might be, how much it might vary, and who would want to know this. I then asked them what the probability of three cars passing by in a five second period might be and this problem was discussed amongst them, with much guessing. After this they worked in pairs, with one student keeping track of time (five second intervals) and the other recording. I told them to get a set of thirty recordings and then to make a histogram. I overestimated my instructions, however, and they were immediately confused, so Mrs. Chay jumped in and she and I did a few practice runs, with me keeping track of time and she counting cars in a single lane. She also did an extremely short review of histograms, as they had barely done them. Finally, they constructed their histograms and I brought up the definition of the Poisson distribution with the equation and some sample plots done. I explained the equation and they compared their histograms to the analytical ones. We discussed why theirs may differ and what could be done to improve it.

GK-12 Lesson Plan

Teacher:
Period: **Class:**
Date(s):

SETTING THE STAGE	
Essential Question	How can we use our knowledge of exponential functions to better understand some common real life situations where randomness occurs?
Content Objective(s) (Student-friendly)	To gain an understanding of how the rate at which cars appear on a highway can be classified using exponential functions.
Connection to previous or future lessons	This lesson expands upon the lesson involving the traffic simulation, and leads into exponential.
Critical Thinking Questions	
Key Vocabulary	Poisson distribution
Materials Needed/Safety	Stream of highway
ACTIVE INSTRUCTION	
• Launch (Engage)	A live stream of the highway with acceptable conditions is shown to the students. I will ask the students what they believe the average number of cars arriving on the highway every five seconds is, and what the probability that one car arrives is. What is the probability that ten cars arrive? Can we find this? How?
• Investigation (Explore)	They are asked to work in pairs. One student keeps track of time, the other counts cars. A time interval of five seconds is chosen. One student keeps track of when five seconds occurs and the other keeps track of the number of cars that pass in this interval. After this is performed the students are asked to construct a histogram. This is essential in my case as the students need all the graphing help they can get. I tell them to normalize the y-axis by dividing by the number of intervals taken (30).

GK-12 Lesson Plan

Teacher:

TIME FOR REFLECTION	
• Summarization (Explain & Extend)	What does this histogram represent? Can you now tell me the probability of having one car arrive in five seconds? To further summarize I show them the equation for the Poisson and explain what the variables mean and how it can be used to find the probability of X number of cars given Y average. I also show them a set of Poisson plots and ask if theirs is similar. If not, how come? I explain how more than thirty samples are needed to get a nice, clean result.
• Assessment (Evaluate)	This is performed along the way.
• Homework	None.