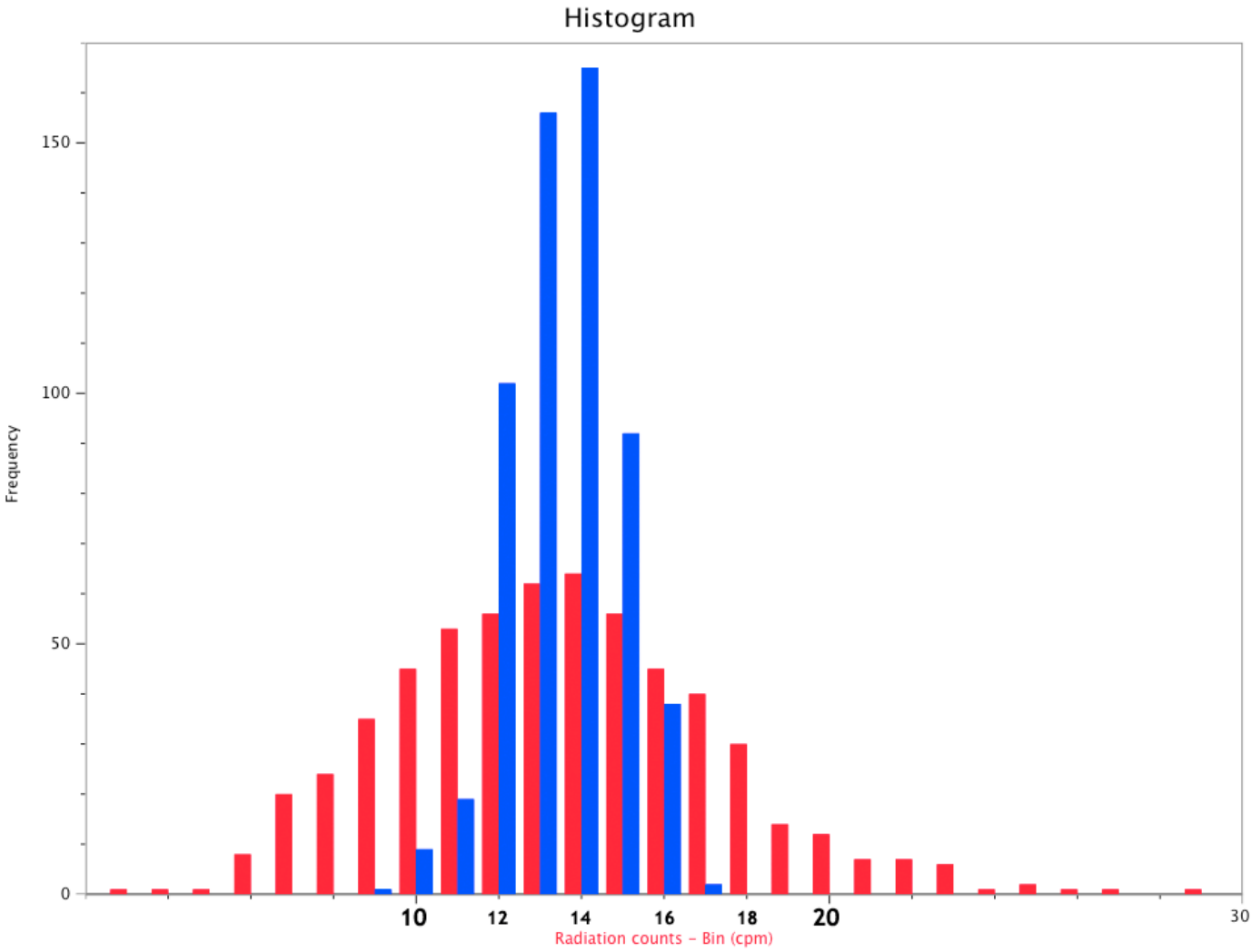
IiR Activity 1.21 The Official Method Name:

Here is a histogram of ten hours of radiation data collected in Chamberlain, SD. Again, the software was counting geiger counter clicks on one minute intervals. The taller bars are ten minute averages while the lower bars are one minute counts. Use the histogram to answer these questions:



1. Roughly what is the average radiation reading in Chamberlain?

2. What was the highest ten minute average detected in Chamberlain?

3. Suppose someone got a new ten minute average of 18 CPM. Is it very likely that this could have happened by chance? Or is it more likely that there was more radiation for some reason? Why?

4. How wide is the histogram of the ten minute averages? That is, what is the difference between the highest and lowest ten-minute averages?

5. Compare that difference with the standard deviation of the one minute counts, which was close to 4 CPM. About how far is it from the center of the ten-minute-averages histogram to one side or the other of the ten minute averages?

6. Suppose you were in Chamberlain but you didn't have time to collect ten hours worth of data. If you were to collect just one ten-minute average in Chamberlain, can you use the St. Dev. of the one minute counts to estimate the width of the histogram of the ten minute averages that you *would* get, were you to collect the data?

As a general rule, the St. Dev. of the one minute counts is usually very close to half the width of the histogram of the ten minute averages! This is the basis for our "Official Method".

7. The one-minute data had an average of 13.5 CPM and a St. Dev. of 4 CPM. Suppose someone took data for ten X 1 minute and found they had an average of 18.2 CPM with a St. Dev. of 4.2 CPM. Use the "Official Method" to decide whether this new average could be considered the same as a normal Chamberlain reading, or if it is most likely different. Write down the calculations in detail: