Data Analysis Worksheet Example Answers

Identify a source of interest and **write a hypothesis** regarding how you expect sound levels will vary from the different measurement points.

Example source: Elm Street on the west side of the school building.

Example hypothesis: If the street provides an active source of noise and measurements are taken at three locations: at the street, between the street and school, and in the classroom, then we expect the measured sound level at the street to be louder than in the classroom.

Plot the data for the first data sampling as a **time series plot**. The sound measurements from each smart device most likely started and ended at different times. This difference will cause the x-axis to only report the time range for the first data selection. To remedy this, first create a scatter plot and then change the series chart type to a *line plot*. This maintains the correct x-axis values instead of scaling to the first series' x-axis values.

1. **What can you determine from the time series plot? For example, from where is the loudest noise coming? How does the noise differ from each measurement location?**
   Example answer: The plot shows varying sound levels at each location, however the measurements taken near the source are consistently highest. Some instances when the other locations have higher measurements may be explained by a different source(s) of noise.

2. **Refer to your observation sheet to determine what may have impacted the data. For example, did a bus driving by the source increase the noise level? Did the noise level increase at the other locations as well?**
   Example answer: The noise is consistently highest near the source, but at a few times, the classroom level increases to a measurement higher than the street. Measurements were taken at the same time at all three locations. According to the notes on our observation sheet, no vehicles were driving by at this time and someone slammed the classroom door. This observation explains why the noise level is highest in the classroom at this time.

3. **Is the noise level unacceptable in any location? If yes, how can you remediate?**

Average sound exposure levels needed to reach the maximum allowable daily dose of 100%.

Time to reach 100% noise dose	Exposure level per NIOSH REL
8 hours	85 dB(A)
4 hours	88 dB(A)
2 hours	91 dB(A)
60 minutes	94 dB(A)
30 minutes	97 dB(A)
15 minutes	100 dB(A)
7.5 minutes	103 dB(A)
3 minutes 45 seconds	106 dB(A)
1 minute 52 seconds	109 dB(A)
56 seconds	112 dB(A)
28 seconds	115 dB(A)
14 seconds	118 dB(A)
7 seconds	121 dB(A)

Note: For every 3-dB decrease in noise level, the allowable exposure time is doubled.

Information sources:

EPA (1974) Information on levels of environmental noise requisite to protect public health and welfare with adequate margin of safety. EPA/ONAC 550/9-74-004.
http://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF

NIOSH (1998) Criteria for a recommended standard: occupational noise exposure. DHHS (NIOSH) Publication #98-126. https://www.cdc.gov/niosh/docs/98-126/