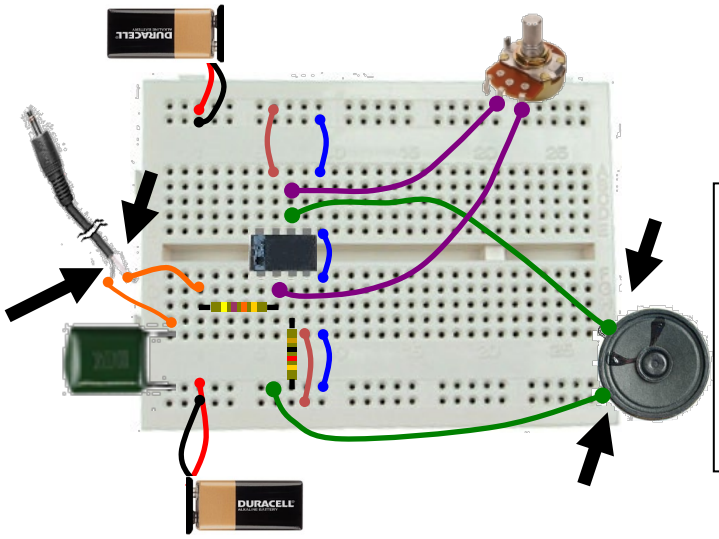
Name:_____Class Period:_____ Date:_____

Signal & Noise in an OpAmp Circuit

In this investigation, you will analyze signal and noise in your OpAmp circuit using two sets of voltage probes and LoggerPro software. You will summarize the results of your investigation in a Word document with a series of graphs. **You may need to autoscale each graph. Be sure to evaluate the noise contribution of each component in your system in your summary. The following questions & prompts will help guide your investigation.

- Open the LoggerPro file OpAmp.
- Connect the two sets of voltage probes to the interface and zero them.
- With the voltage probes not connected to anything at all, measure the voltage noise in your data collection system.
- Try changing the experiment to collect data at a finer time resolution. (1,000 samples per second, etc.) Does changing the time resolution affect the noise?
- Select the maximum sample rate possible for a 0.1 second data collection (typically 5,000 per s)
- Connect the appropriate voltage probe to the audio input wires as indicated below. With the audio plug not connected to any device, measure the noise at the input.
- Connect the second set of voltage probes to the output to the speaker as indicated below. Insert an additional graph. Arrange the graphs and label appropriately for the input & one for the output. Compare the noise at the input and output as the variable resistor is turned up.
- Plug in the audio device—but do not play any signal. Does merely connecting add noise?
- Choose the 60 Hz white noise mp3 file to play. Make sure the low tone is audible and that the variable resistor is turned all the way up. Based on your experiences with the Signal and Noise for a Radio example, determine a method to analyze the signal and noise for the input and the output. Compare the values for signal, noise, and signal to noise ratio for each.
- Complete a similar process for the 800 Hz white noise mp3 file.

Connect the **input voltage** probes to the two wires from the audio input. Be sure the metal tip is in contact with the conducting part of the wire—not the plastic insulation. You may need to add jump wires sticking out of the breadboard and alligator leads if you have trouble with the connections.



Connect the **output voltage** probes to the two speaker terminals. Be sure the metal tip is in contact with the conducting part of the wire—not the plastic insulation.