USEQIP NMR Laboratory - Instructors notes

The "USEQIP NMR Laboratory 1" document is pretty complete and self explanatory, but here are a couple notes you should keep in mind to enhance the student experience and allow them to think about a few things and note just follow the interactions blindly,

1 Just before the lab starts

1. Copy experiments 1 and 3 from USEQIP_2014_prep into experiments 1 and 3 of USEQIP_2014_day$x$
2. Remove the sample from the spectrometer
3. Detune and de-match slightly the Hydrogen channel on the probe
4. Go to experiment 1
5. Slightly change "O1" by about 100Hz
6. Set "sr = 0"
7. set "phc0 = 0"

2 At the beginning of the lab

1. Make you you make the students empty there pockets and give them a few safety point regarding the magnetic field
2. Introduce the spectrometer. Show them the sample, the probe, the electronic console and explain roughly how the system works i.e. the computer give direction, the SGU units mix the waveform and the radio-frequency, sends it to the amplifier, then to the probe, etc...
3. Let them begin with the lab instruction.
4. Once they got their first spectrum, adjusted $O1$ and sr, show them what happen if you you have a bad shim. Crank down Z_1 a lot and get them to take a spectrum. Put Z_1 back to what it was.

3 A few things to pick their brains

1. When they phase their first spectrum in Section 2.2, step 7, ask them why we didn't get an absorption peak right away, i.e. because the spectrometer as no sense of what x and y are.
2. At the same time, ask them why we need to keep that phase and always use the same phase correction, i.e. so that the axes are consistent from one experiment to the next.
3. When they set $O1$ and sr, make sure they understand what those variables are.
4. If there is still time left at the end of the T1 experiment but not enough time to do the T2 experiment, which is likely, take over the spectrometer
   (a) Do a $\pi/2$ J-coupling pulse sequence so that the state to state evolution goes like $ZI \rightarrow -YI \rightarrow XZ$ and make sure they understand the spectrum they see, we would have covered that in class.
   (b) Ask them what would happen in you do a π pulse in the middle of the J-coupling evolution
   (c) Show them that it does a spin echo