Instructor Notes for the TIEE Module: [Investigating the footprint of climate change on phenology and ecological interactions in north-central North America (Kellen Calinger*, The Ohio State University, 2014)](#)

1. Preparation before lab
   a. Lecture about flowering, pollination
   b. Review of graphing and regression in earlier lab on statistics
   c. Students printout lab handout and read before attending lab
      i. Slightly modified TIEE module to include language for pair/group work
      ii. Added links to data in the lab handout, this helped to make the lab more efficient, as many students used their own computers and had a digital copy of the lab handout and therefore could quickly access the data
      iii. I added tutorials on EXCEL at the end of the lab, for students that might need the extra support
2. In lab (3 hours long):
   a. At the beginning of the lab I introduced the concept of phenology with these two videos:

      https://www.youtube.com/watch?v=EfAcoDO5u4Y

      https://www.youtube.com/watch?v=wWh6ulBsLHE

   b. Before beginning the activity:
      i. I reminded students that at the end of their lab handout there is an appendix with a brief tutorial on using excel and doing regression, as well as a link to a HHMI tutorial
      ii. I assigned student pairs two climate divisions to analyze and then directed them to write Spring Temperature Change values on the board for all of the class to use for the analysis of Statewide Long-term Temperature Trends
   c. During lab (took about 2.5 hours)
      i. After data completed for each division, students shared their data on the front board
      ii. I recommend doing the cherry-picking activity at the same time as students examine temperature trends, instead of putting it off to the end of the lab, as recommended in the module
      iii. Then students worked in table groups (4-5 Ss) and completed the remainder of the lab, thereby encouraging discussion.
      iv. I reminded students to not only look at the regression line and slope (needed for phenology activity), but to also look at the R^2 values as an

important aspect of evaluating data and trends and predictive models. encouraged discussion

     v. Students handed in their lab handouts at the end of lab to be assessed for their analyses and evaluation of the data and its application to the learning objectives

3. <u>Post lab:</u>
   a. Reinforced ideas of range shifts/trophic mismatch in climate change lectures
   b. Reinforced statistical significance of data by examining R^2 and p-values
   c. Included additional assessment of TIEE module on the final exam as an essay question addressing ecological mismatches.