Wrap-up Questions:

1. How did the fish abundance and species distribution differ among the habitats in the transects you surveyed with the video?
    a. *The answers here will vary <u>widely</u> as each group will have its own combination of transects that they chose to survey and analyze. They should comment on the different species they saw, what types of habitat (high-relief, sand, rubble, etc.) seemed to have the most/least fish, and so on. Transects in the higher relief habitats (ridges, reef tops) likely had higher abundances and more diversity. The lower relief areas could still have had small areas of rock rubble where fish were found. In the flat, sandy areas, it's possible that no fish were observed at all.*
2. How might your choice of transects have affected your results for the towed camera survey? If you were to start over, would you change your sampling approach in any way?
    a. *Students may have concentrated transects too much in areas that only had relief to see the most fish but in doing so missed portions of the fish populations over low relief of flat, sandy areas. These are still important because although it may appear they do not have high abundances of fish, they encompass much larger areas than the high relief areas so the numbers can add up significantly. Perhaps they didn't distribute their effort over enough different depths which can greatly affect the types of fish observed.*
3. How did the video data compare and contrast with the trawl data? If there were significant differences in the densities and species compositions, why do you think that was? What do you think are some pros and cons of the two types of equipment, keeping in mind you may not have had ALL of the available data for use in this lab?
    a. *The answers will vary based on what transects were chosen but some generalizations that can be made between the two are that they likely did not observe all the same types of fish and that the densities may be different by orders of magnitude. In the latter case, fisheries scientists would have to do more research about why they're getting very different numbers of fish for the same area of seafloor as either one or both sampling approaches is not accurately representing the fish populations. Students also should be able to note some of the relative advantages and disadvantages of each approach. For example, the video data provided counts that could be readily associated with specific habitat at very high spatial resolution. Students may have noticed that fish react to the towed camera system which can make them difficult to identify and there may have been issues with water clarity (less transparent water and high phytoplankton concentrations result in difficulty to see/identify fish on video). As for the trawls, though they tend to catch a wider array of species and*

have been collected over many years and a more regional scale, the counts cannot be easily associated with any kind of habitat information. They also cannot be used over certain types of habitats because the net could become snagged and lost.

4. Now that you're familiar with how the trawl net and towed camera system work, in what ways would you recommend they be modified so that the data quality could improve and why would you suggest those improvements? This could be either how the systems are used, what sensors they have onboard, etc. You will likely have do some online research about what other types of ocean-going instruments are out there to get some inspiration!
    a. *It should be obvious in their responses that students took time to think about what information was missing from the trawl and towed camera survey that would be important to better understanding fish populations for the purposes of better managing them. As opposed to just making a list of improvements, students should give a short explanation for why each suggestion is being made.*