Invertebrate Concept Map (ICM)
### ~ extra-credit assignment and study aid ~

Biology of Invertebrates is full of detailed information but is also rich with connections among pieces of information that can ultimately emerge into a more conceptual view of how organisms are built and how they work. As one small example, recognizing that spermcast spawners require a mechanism for capturing sperm, and therefore are largely restricted to suspension feeders, makes a fundamental connection between reproductive and feeding systems in sponges as well as among other spermcast spawner/suspension feeders. Throughout the course I will be giving you many bits of information and asking you to make such connections to build your web of understanding of the functional design of animals.

One way to organize such information is in a **concept map**, which shows relationships between terms or concepts by connecting them using descriptions of those relationships. Developing such a map can be fun, challenging, creative, and an illuminating way to develop common themes and see the bigger picture—that is, a good way to visualize, synthesize, and retain information for exams. Your goal is *not necessarily* to produce a beautiful product but rather to capture information, work through the process of connecting it into concepts, and uncover your own understandings and misconceptions.

For this optional assignment you have complete freedom to create your own concept maps. You could create one big map or divide it into smaller maps separated by taxon or functional system (e.g., feeding, excretion). You could work on a map alone or collaborate with a study group—the software I will recommend acts as a wiki for collaboration. I don't have any preconceived ideas about what you could produce, and the possibilities are limitless.

Constructing your ICM in Popplet
You can construct your concept map using the free online software Popplet (http://popplet.com) (or you can use anything else that allows you to achieve these goals).   Here is an example of what Popplet can produce using the example above:
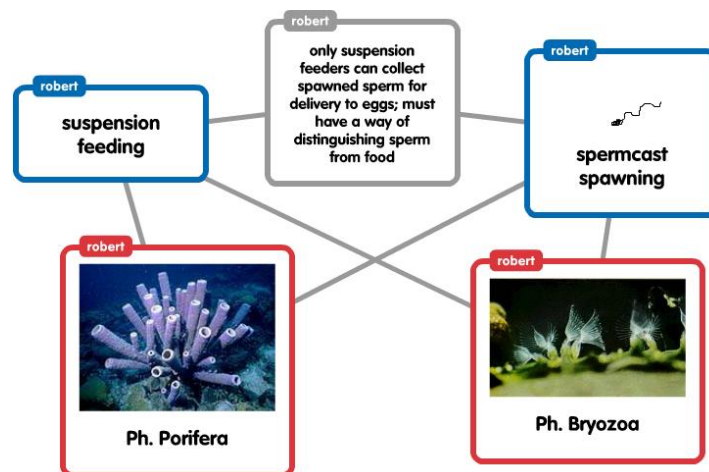
Note that I put taxa in red, processes in blue, and explanations in grey. The software allows you to use lines to make connections and to maintain them as you move boxes around. The process works on regular computers but is especially fluid on touch-screen tablets and phones. (Alternatively you could put the grey boxes *on* connector lines without formally connecting them, but you would need to reposition the grey box every time you changed positions of the other boxes.)

Here is how I suggest you proceed:
1. Write terms in Popples (boxes). It might be useful to start with taxonomic groups at a center point and work outward with terms and processes from there. Color the boxes according to their role. Add a picture or do a drawing if you wish.
2. Use lines to connect your taxa/concepts/terms/processes and to include your explanation boxes. Good explanations highlight how two or more boxes relate to one another.
3. If collaborating, invite others in your group to work on the same concept map using the "share" button. To share a common popplet, each team member needs to have a free account. One good way to collaborate would be to talk about course material as you work on your own screens while making changes. Or, you can add to the popplet at separate times. The boxes contributed by a given person will have his or her name attached.
4. Be sure to save your work frequently to make sure that saving is working. Along the way, export your map as a PDF file (use the blue wheel icon, and choose "export as PDF"). Send me the file if you want feedback about whether you are going in a good direction.
5. Add to your map after every lecture or while studying for exams, or start a map as new information comes in.

Extra credit
To gain your extra credit at the end of the course you **must show me your progress around the time of each exam**. I am willing to **add up to 3.33%** to your final course grade in extra credit (the actual amount depends on your effort on this assignment and will range widely). To put this into perspective, 3.33% is worth more than 1/2 of the points on your first laboratory practical exam, and would be a full jump in letter grade level (e.g., from B+ to A-). Because the credit is added <u>after</u> the final curve, this credit can bump up everyone's grade. More importantly, if done effectively, reinforcing the course information in this way can raise your grade on exams as well.

The first time I tried this, I was very impressed with the results. I received many different designs that appeared to reflect different ways of organizing the information. I am eager to see what you come up with. Instead of taking notes on your notes, make a popplet! Feel free to show it to me for a consultation at any time.