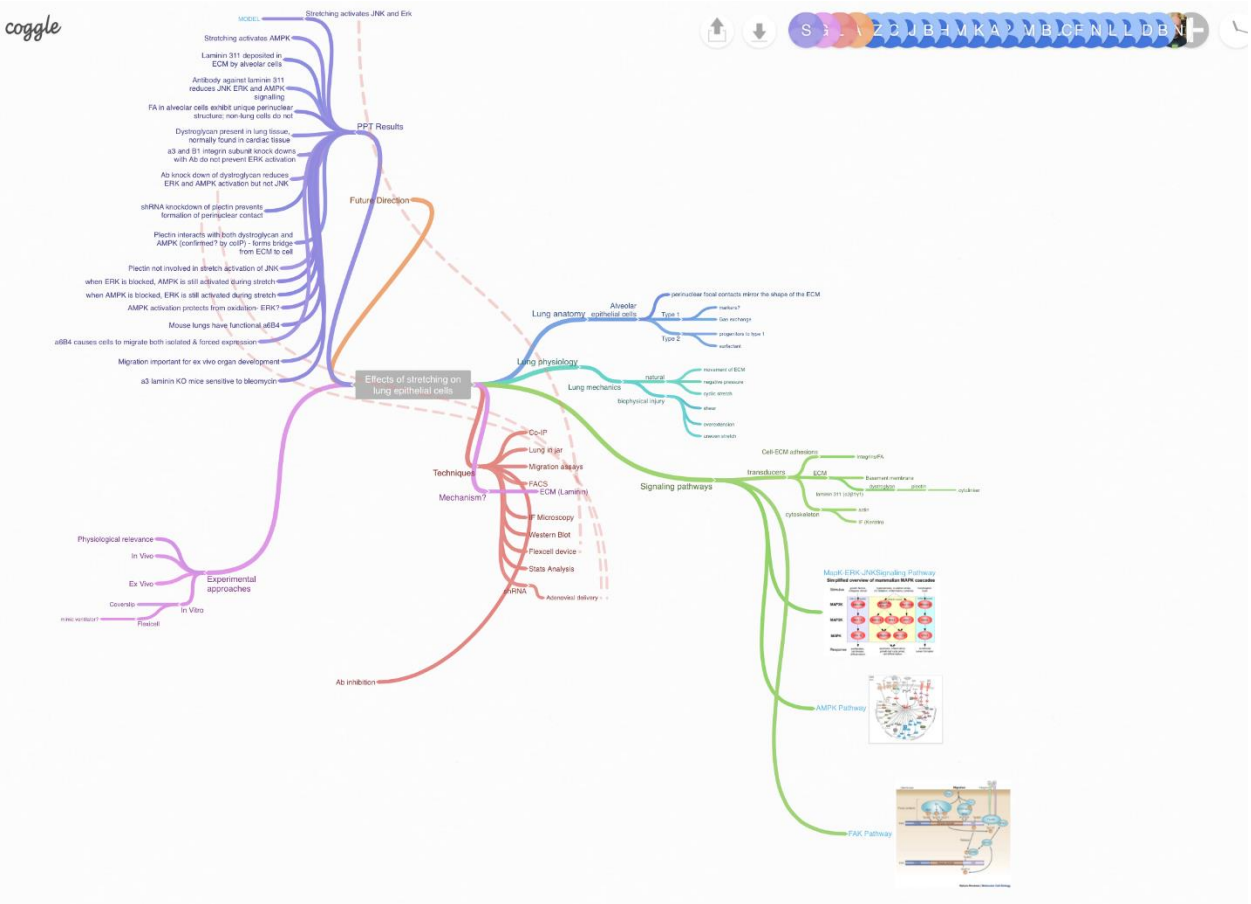
Scientific Teaching: "Active learning helps you too"
Teaching Mentoring Program Sponsored by the CVM Teaching Academy

Readings and Resources:

Learning Tool:

https://coggle.it/ An example which was created by class members during the Deconstruction of Research course Fall 2014 is included here as a PDF. Check out this learning tool. It is free and very versatile. Image file below.

Example Coggle:



Gathering evidence in scientific teaching:

Bloom's Taxonomy: at http://ww2.odu.edu/educ/roverbau/Bloom/blooms_taxonomy.htm

This provides information or the original and updated (1990) version of Bloom's Taxonomy with sufficient definitions to facilitate writing student learning outcomes.

A model of learning objectives: at http://www.celt.iastate.edu/teaching-resources/effective-practice/revised-blooms-taxonomy/

This provides a powerful visual representation of taxonomy along the dimensions knowledge and cognitive process. A nice resource for examples of metacognition across knowledge spectrum.

Tips on writing good learning objectives: at http://www.celt.iastate.edu/teaching-resources/course-planning/syllabi/writing-learning-objectives/

This is a nice short primer which includes sufficient background, examples and many verbs mapped to each level of the cognitive domain.

Assessment primer: learning taxonomies: at http://assessment.uconn.edu/primer/taxonomies1.html

This includes a characterization of the cognitive domain balance between upper division and lower division courses, affective domain, and psychomotor domain.

About teaching:

Knight, & Wood (2005). Teaching More by Lecturing Less in Cell Biology Education: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1305892/pdf/i1536-7509-4-4-298.pdf

Provides some evidence to support learning gains between groups.

Allen & Tanner (2005). Infusing Active Learning into the Large-enrollment Biology Class: Seven Strategies from Simple to Complex. In Cell Biology Education. http://www.lifescied.org/content/4/4/262.full.pdf+html

Provides descriptive examples of the ways that faculty are implementing various forms of active learning. Extensive reference list for more details on the particulars the examples.

Brownell & Tanner (2012) Barriers to Faculty Pedagogical Change Lack of Training, Time, Incentives, and …Tension with Professional Identity? In Cell Biology Education. http://www.lifescied.org/content/11/4/339.full

Explores some barriers to change of pedagogy.

Tanner (2013) Structure Matters: Twenty-one Teaching Strategies to Promote Active Engagement and Cultivate Classeoom Equity. In Cell Biology Education. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3762997/

Romsdahl & Hill (2012). Applying the learning community model to graduate education: Linking research and teaching between core courses. In Teaching in Higher Education. http://www.tandfonline.com/doi/abs/10.1080/13562517.2012.678325#.VS2ONvnF_UI

Includes science discipline, graduate studies and little educational theory.

Jones (2014). Examining the Influence of Structured Collaborative Learning Experiences for Graduate Students. In Journal on Excellence in College Teaching. http://celt.muohio.edu/ject/fetch.php?id=598

Makes the case the graduate education is a perfect place to include collaborative learning.

Johnson D. W., Johnson R. T., Smith K. A. (2014). Cooperative Learning: Improving University Instruction by Basing Practice on Validated Theory. In Journal of Excellence in Higher Education. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCQQFjAA&url=http%3A%2F%2Fpersonal.cege.umn.edu%2F~smith%2Fdocs%2FJohnson-Johnson-Smith-Cooperative_Learning-JECT-Small_Group_Learning-draft.pdf&ei=rJAtVcTMK8uqogTb1YKgBA&usg=AFQjCNFQTB2OrUl14BxxQzwr47ACRAn4ZQ&sig2=PJMiDmaQ8GTozxJg3iaHUg&bvm=bv.90790515,d.cGU

Important distinctions of cooperative learning included. Not specific to science disciplines.