***Science from Scientists’ Approach to Student Centered Learning***

***A Student­centered philosophy***

Many states, including Massachusetts, are adopting a new set of science standards based off of the Next Generation Science Standards (NGSS). While the NGS Standards address science, technology, and engineering content across different academic levels, the focus is on student­centered learning.

The student­centered learning approach emphasizes student exploration, engagement, and inquiry rather than teacher­centered lectures and rote­learning. At Science from Scientists (SfS), we understand the importance of the student­centered approach and are modifying our curriculum accordingly. In addition to decreasing introductory lecture time and the addition of the 5E model (details below), our lesson plans offer in­classroom tools to help instructors pick strategies to emphasize student engagement from the beginning of class rather than lecturing before the activity.

***Science from Scientist’s Adaptation of the 5E Model***

**What is the 5E model?**

In our movement towards more student­centered lessons, we have adopted (and adapted) a version of the BSCS 5E Instructional Model.

The 5E model consists of 5 phases which all start with E’s ­ Engagement, Exploration, Explanation, Elaboration, Evaluation (and sometimes also Elicit and Extension). These names are meant to easily convey the purpose of a lesson or segment of a lesson from the perspective of both teacher and student.

This model incorporates cooperative learning (e.g., student groups), recognition of students’ prior knowledge and experience as a base to build upon, and exploration time to construct new meaning. While often employed for week(s)-long curriculum units, we have found that the basis of the model is still very useful for SfS lessons.

Adapting this model ­ and the perspectives of each phase ­ will enable us to focus on being more student­centered and approach our lessons in a different way.

**How is Science from Scientists Adapting the 5E Model?**

* **Engage**: The incorporation of a short activity that accesses student prior knowledge and/or promotes interest in the phenomenon being explored.
  + Often part of an “Introduction” and includes lesson features like Lecture Demonstrations and Teaching Tools (e.g., Think, Pair, Share)
  + Other content information: Some content **is** necessary to cover before students start the main activity. This content is generally what is included in the “Content Outline” and should still be accomplished in a more interactive student­focused versus instructor­focused way.
* **Explore**: Students complete the activity(ies) that help connect their prior knowledge to exploring questions and forming new meaning.
* **Explain**: Focuses on a part of the exploration and has the students explain the phenomenon (essentially it’s a student­centered debrief).
* **Elaborate** / **Extend**: Students further develop their understanding of the topic and/or their skills
  + Ideally this is done through another short activity in classes that can incorporate it, whether that be because of time or prior student knowledge.
  + This phase can also be accomplished through promotion of the Follow up Student activities.
* **Evaluate**: Students assess their understanding and abilities
  + Can be thought of as the SfS quiz, formal in­class evaluation (e.g., classroom tests), or a part of the activity, depending on the lesson.

For more information about the 5E model, feel free to check out the following resources:

* ●  Editorial by Rodger Bybee (2014), creator of 5E Model
* ●  BSCS 5E Instructional Model website
* ●  WGBH explanation of 5E model