GRADES 6 – 8 TEACHERS SCIENCE PROFESSIONAL LEARNING

Bathurst, Friday January 26th, 2017

LESS OF THIS, MORE OF THIS

Less of This	More of This
Rote memorization of facts and terminology	Facts and terminology learned as needed while students are developing explanations and designing solutions supported by evidence-based arguments and reasoning, in the context of crosscutting concepts and core ideas
Learning of ideas disconnected from questions about phenomena	Learning of core knowledge focused on explaining phenomena and understanding context for the ideas and information, using crosscutting concepts
Teachers providing information to the whole class	Students conducting investigations, solving problems, and engaging in discussions with teachers' guidance to trace connections to crosscutting concepts and core ideas
Teachers posing questions with only one right answer	Students discussing open-ended questions that focus on the strength of the evidence used to generate claims and the significance of the ideas
Students reading textbooks and answering questions at the end of the chapter	Students reading multiple sources, including science-related magazine and journal articles and Web-based resources; students developing explanations that summarize what they've read and answer key questions
"Cook-book" laboratories or hands-on activities with pre-planned outcomes	Multiple investigations driven by students' questions with a range of possible outcomes that collectively lead to multiple explanations or arguments about outcomes
Worksheets	Students writing journals and reports; creating posters and media presentations that explain, argue, and elaborate on ideas related to performance expectations
Oversimplification of activities for students who are perceived to be less able to do science and engineering	Providing supports so that all students can engage in sophisticated science and engineering practices, applying them in answering science questions

SOURCE: Adapted from National Research Council (2015).

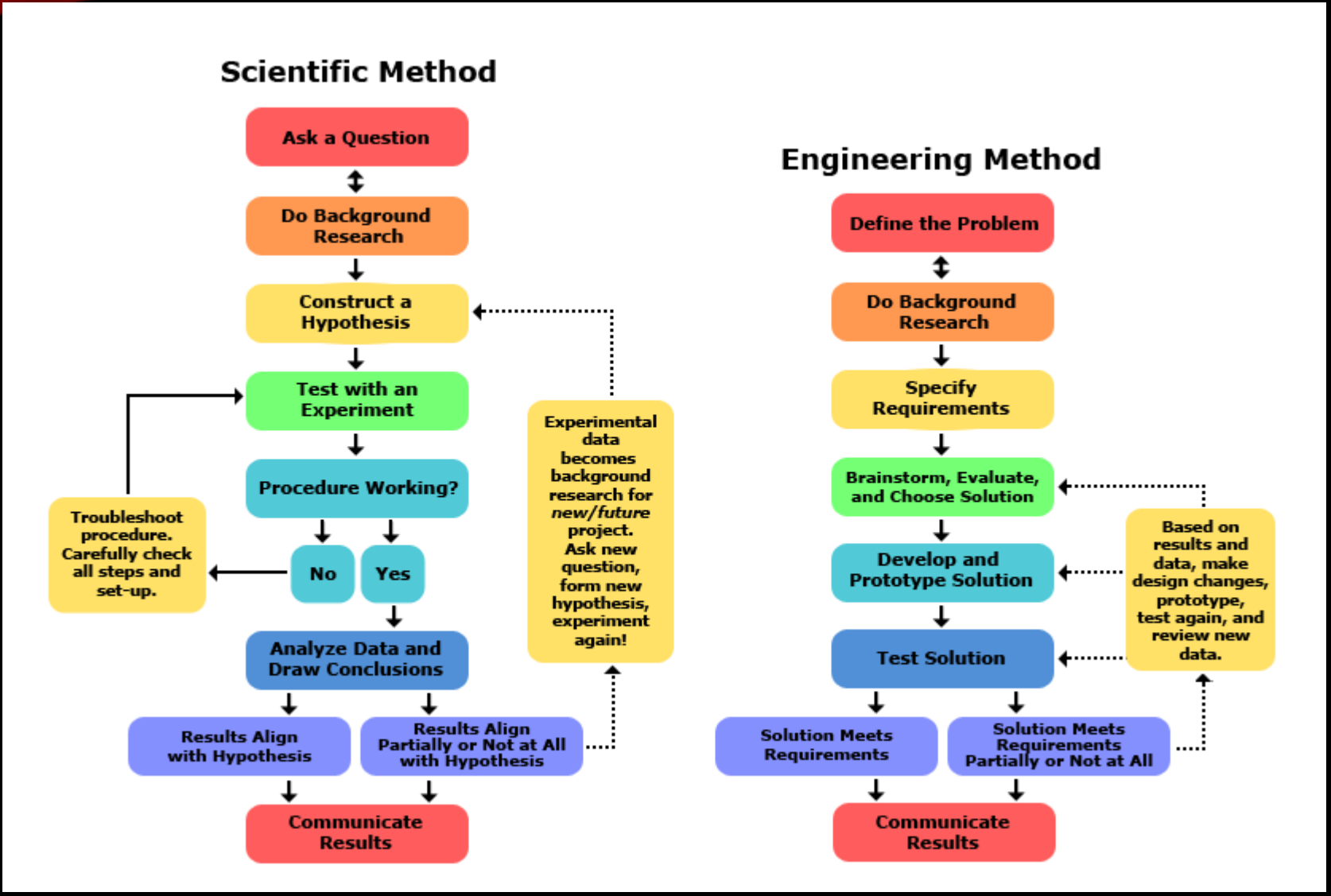
THE NATURE OF SCIENCE

- Science Literacy is everyday – not only during a block of time in March-May.
  - Is it possible to not silo subjects?
- Goes beyond a body of knowledge.
- Challenge is to engage students in a broader view of science – one that addresses the development of scientific knowledge and the nature of knowledge itself. (Teaching the Nature of Science: Three Critical Questions, by Randy L. Bell Ph.D.)
  - Body of Scientific Knowledge (science textbook)
  - Set of Methods/Process (experiments and technological problem solving)
  - A Way of Knowing (nature and characteristics of the generated knowledge)
    - Misconceptions/Misinterpretations of Science
    - Requires discussion and reflection.

CHANGES TO CURRICULA

Past Science Units: Fall 2002 – Spring 2017				
Grade	**Topic 1**	**Topic 2**	**Topic 3**	**Topic 4**
3	Plant Growth and Changes	Exploring Soils	Invisible Forces	Materials & Structures
4	Habitats	Light	Sound	Rocks, Minerals, and Erosion
5	Meeting Basic Needs & Maintaining a Healthy Body	Properties & Changes in Materials	Forces & Simple Machines	Measuring & Describing Weather
Transitional Science Topics: Fall 2017 - Present				
3	Plant Growth and Changes	Exploring Soils		
4	Habitats	Rocks, Minerals and Erosion		
5	Properties & Changes in Materials	Forces & Simple Machines		
Approved Future Curricula: Date ???				
3	Soils in our Environment	Habitats, Plants and Animals		
4	Properties of Matter	Rocks and Minerals of the Earth's Crust		
5	The Human Body	Simple Machines		

TECHNOLOGICAL PROBLEM SOLVING



- Engineering Design Process
- Planning a STEM Fair or similar activities in your class/school?
  - It takes a long time.
  - Not a home project.
  - Use me.

https://www.sciencebuddies.org/science-fair-projects/science-fair

SCIENCE SKILLS: RESOURCES

- PhET Science Simulations: https://phet.colorado.edu/en/simulations/category/new
- Technological problem solving with stories.
- Documents for grades 6-8 that flesh out the inquiry process.
  - Plan & Perform and Analyze & Explain strands for reporting
  - Curriculum is more than assessment strands
  - Lesson guides
  - Student Tracking Documents
  - http://stemnorth.nbed.nb.ca/
- Smarter Science Framework
  - Definitions of the science process skills.
  - Experiment planning sheets for teachers and students.
- Smarter Science Resources: http://smarterscience.youthscience.ca/

STEMFEST: MARCH 17TH, 2018

- Terry Fox Elementary
- New judging rubric (from the Canada-Wide National Fair)
- Exhibit Guidelines, Ethics and Safety Information
- Project Reports (grades 6 – 12, not necessary, but encouraged)
  - STEM Journal
- Science Buddies Website
- Activities and build for students, teachers and parents.

PLANNING TIME

- Share and Plan an activity for your students.
  - Less of This, More of This
- Review the various documents.
- One collaborative site.
- Plan for Winter/Spring 2018
  - How can I help you and your school?
    - Within your classes.
    - Activity as part of a whole school PL?
  - Planning a school STEMFair
    - Keep it feasible, small – two or three from each class.
  - Fluid Power Competition
  - Innovation Night: May 2018

- Thanks for Participating!