Biology Network Meeting
February 6th 2017
Why the new New York State Science Learning Standards?
Today’s Science Students
The NYSSLS

Performance Expectations

**HS. Structure and Function**

**HS-LS1-1.** Construct an explanation based on evidence for how the structure of the DNA determines the function of genes which carry out the essential functions of life through systems of specialized cells. [Clarification Statement: Emphasis should be on how the DNA code is transcribed and translated in the synthesis of proteins. Types of proteins studied in performing the functions include enzymes, structural proteins, cell receptors, hormones, and antibodies.] [Assessment Boundary: Assessment does not include identification of specific cell or tissue types, whole body systems, specific protein structures, types of cells, or the cardiovascular system.]

**HS-LS1-2.** Develop and use a model to illustrate the organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism’s system level such as nutrient uptake, waste delivery, immune response, and organism response to stimuli. An example of an interacting system that could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [Assessment Boundary: Assessment does not include interactions and functions of the molecule or cellular reaction level.]

**HS-LS1-3.** Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, respiratory rate to maintain temperature, and root development in response to water levels.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanisms.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*.
The Three Dimensions of the NYSSLS/NGSS

This is a shift to an environment where students use

- disciplinary core ideas
- crosscutting concepts
- scientific and engineering practices

to explore, examine, and explain how and why phenomena occur and to design solutions to problems

Source: http://www.activatelearning.com/3-dimensional-learning/
Before we go any further.....

You are probably doing most of these things right now!

Just like evolution, we just need to tinker...
## Disciplinary Core Ideas (DCI):

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<th>Life Science</th>
<th>Earth and Space Science</th>
<th>Physical Science</th>
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<td>LS1: From Molecules to Organisms: Structures and Processes</td>
<td>ESS1: Earth’s Place in the Universe</td>
<td>PS1: Matter and Its Interactions</td>
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<td>LS2: Ecosystems: Interactions, Energy, and Dynamics</td>
<td>ESS2: Earth’s Systems</td>
<td>PS2: Motion and Stability: Forces and Interactions</td>
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<td>LS3: Heredity: Inheritance and Variation of Traits</td>
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<td>LS4: Biological Evolution: Unity and Diversity</td>
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<td>PS4: Waves and Their Applications in Technologies for Information Transfer</td>
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Disciplinary Core Ideas

LS1: 2nd grade

**Disciplinary Core Ideas**

**PS1.A: Structure and Properties of Matter**
- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

**PS1.B: Chemical Reactions**
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)
Science and Engineering Practices

We need to dispel the misperception that science is just a bunch of facts.

Make science into something students do and not just take.
Science and Engineering Practices are language intensive and promote language learning

- Asking Questions and Defining Problems
- Constructing Explanations and Designing Solutions
- Planning and Carrying Out Investigations
- Developing and Using Models
- Engaging in Argument from Evidence
- Using Mathematics and Computational Thinking
- Analyzing and Interpreting Data
- Obtaining, Evaluating and Communicating Information

Diagram:

- Asking questions and defining problems
- Obtaining, evaluating, and communicating information
- Engaging in argument from evidence
- Constructing explanations and designing solutions
- Developing and using models
- Using mathematics and computational thinking
- Planning and carrying out investigations
- Analyzing and interpreting data
The Three Dimensions of the NYSSLS

Cross Cutting Concepts

- Patterns
- Cause and Effect: Mechanism and explanation
- Scale, Proportion and Quantity
- Systems and Systems Models
- Energy and Matter: Flows, cycles, and conservation
- Structure and Function
- Stability and Change
Resources
