

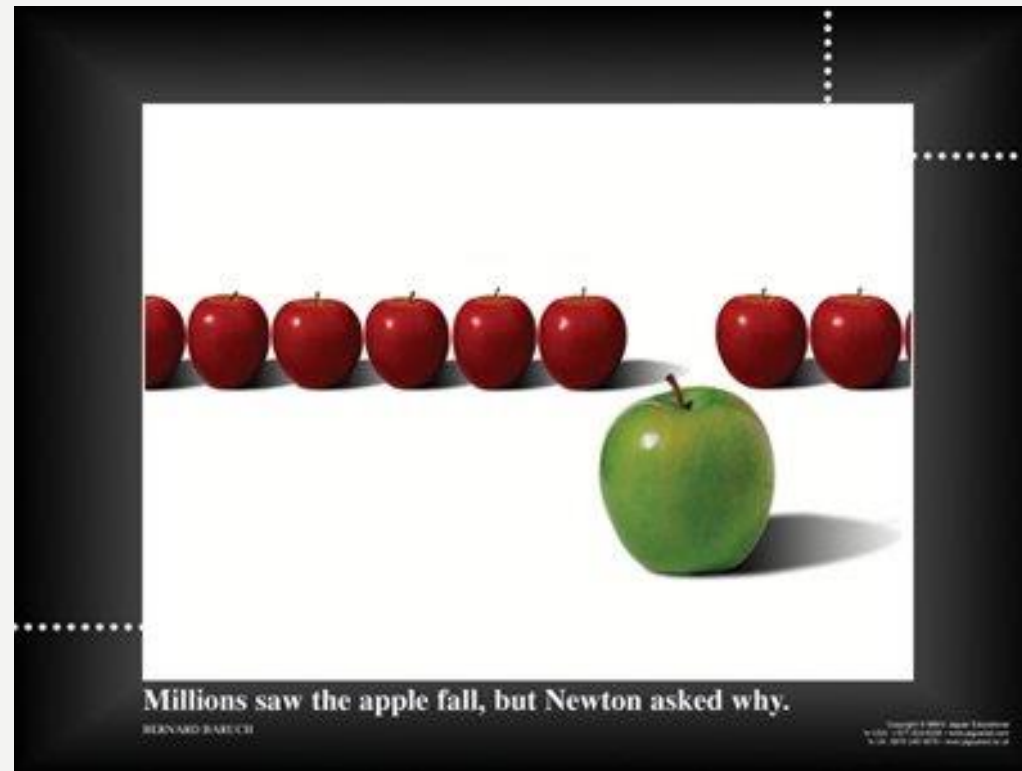
NGSS CRASH COURSE



OCTOBER 24, 2016

PURPOSE & VISION OF NGSS

- “Facts are not Science, as the dictionary is not literature.”
-- Martin H. Fischer (1944)



A LITTLE HISTORY.....

- Last IL state adoption was in 1997
- Not grade specific – but in 4 bands
 - Early Elementary
 - Late Elementary
 - Middle/Junior High School
 - High School
- Students were tested in 4th, 7th, & 11th grade
- 3 Goals outlined in the standards
 - Goal 11 – Inquiry & Design
 - Goal 12 – Concepts & Principles
 - Goal 13 – Science, Technology, & Society

STATE GOAL 12: Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.

Why This Goal Is Important: This goal is comprised of key concepts and principles in the life, physical and earth/space sciences that have considerable explanatory and predictive power for scientists and non-scientists alike. These ideas have been thoroughly studied and have stood the test of time. Knowing and being able to apply these concepts, principles and processes help students understand what they observe in nature and through scientific experimentation. A working knowledge of these concepts and principles allows students to relate new subject matter to material previously learned and to create deeper and more meaningful levels of understanding.

A. Know and apply concepts that explain how living things function, adapt and change.

EARLY ELEMENTARY	LATE ELEMENTARY	MIDDLE/JUNIOR HIGH SCHOOL	EARLY HIGH SCHOOL	LATE HIGH SCHOOL
12.A.1a Identify and describe the component parts of living things (e.g., birds have feathers; people have bones, blood, hair, skin) and their major functions.	12.A.2a Describe simple life cycles of plants and animals and the similarities and differences in their offspring.	12.A.3a Explain how cells function as "building blocks" of organisms and describe the requirements for cells to live.	12.A.4a Explain how genetic combinations produce visible effects and variations among physical features and cellular functions of organisms.	12.A.5a Explain changes within cells and organisms in response to stimuli and changing environmental conditions (e.g., homeostasis, dormancy).
12.A.1b Categorize living organisms using a variety of observable features (e.g., size, color, shape, backbone).	12.A.2b Categorize features as either inherited or learned (e.g., flower color or eye color is inherited; language is learned).	12.A.3b Compare characteristics of organisms produced from a single parent with those of organisms produced by two parents.	12.A.4b Describe the structures and organization of cells and tissues that underlie basic life functions including nutrition, respiration, cellular transport, biosynthesis and reproduction.	12.A.5b Analyze the transmission of genetic traits, diseases and defects.

WHAT DO THESE NEW STANDARDS LOOK LIKE?

MS-LS1 From Molecules to Organisms: Structures and Processes

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Students who demonstrate understanding can:

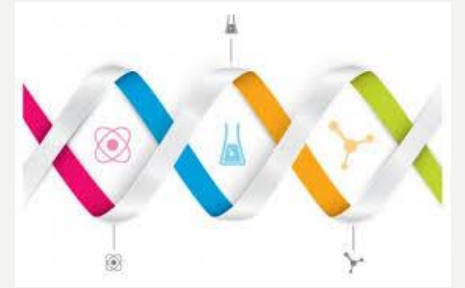
MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]

MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.] [Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.]

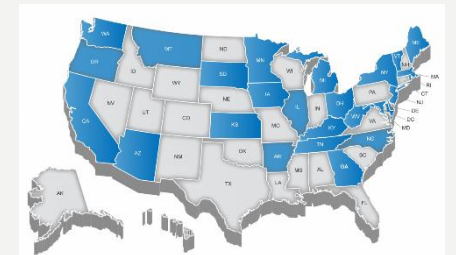
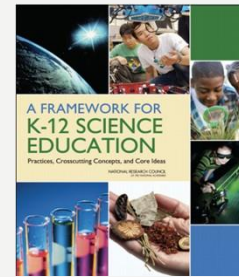
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NGSS DEVELOPMENT

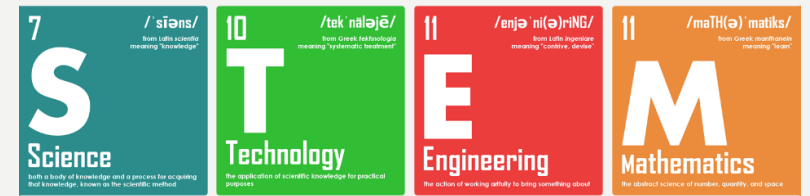
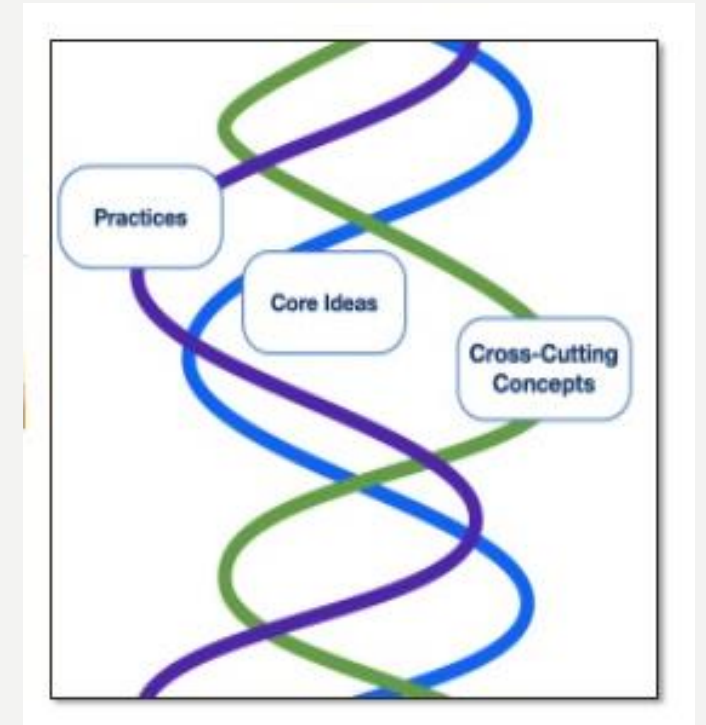


- NGSS \neq Common Core
- Common Core ELA does include literacy standards for science & technical fields, but these **do not include** science content standards.
- Partnership between NSTA (National Science Teachers Association); NRC (National Research Council); American Association for the Advancement of Science, and Achieve Inc.
- NGSS is **NOT** a federal initiative
- The Carnegie Foundation funded the development.
- NRC wrote the *Framework* (*vision of what Science should look like*); which was the guiding document for the NGSS writing team
- Illinois was one of the lead states (26 states that contributed to the writing/development process).



SHIFTS REQUIRED FOR SUCCESSFUL IMPLEMENTATION

- Classroom experiences must reflect how science is done in the ***real world*** by intertwining ***3 dimensions***: scientific & engineering practices, crosscutting concepts, and disciplinary core ideas.
- The NGSS are student performance expectations, ***not*** curriculum. They are there as a guide as curriculum is developed.
- The standards build coherently from grades K-12, in all 3 dimensions.
- Focus on deeper understanding of content and applications of content.
- Integration of science, technology, and engineering throughout grades K-12.
- Connections to the CCSS in English language arts (ELA) and Mathematics.



HOW WILL SCIENCE EDUCATION CHANGE WITH THE NGSS?

- Lessons/Units will shift from “learning about” to “figuring out”.
- Lessons/Units designed to make sense of phenomena or design solutions to problems.

How does water shape our world?

How does water move?

What happens to properties when substance combine?

How does water shape our land?

What is inside me?

How can I make new stuff from old stuff?

What is breaking food down inside me?

HOW WILL SCIENCE EDUCATION CHANGE WITH THE NGSS?

- Teachers as facilitators, **NOT** lecturers.
- Students will #KeepMovingForward by living our vision –
- **ALL** students will do Science.



An Analogy between 3-Dimensional Learning and Cooking



Kitchen Tools &
Techniques
(Practices)



Basic Ingredients
(Core Ideas)



Vegetables, Herbs,
Spices, &
Seasonings
(Crosscutting
Concepts)



Preparing a Meal
(Three dimensional Learning)

DISTRICT NEXT STEPS

- Middle School – Implementing the new NGSS aligned curriculum – STEMscopes
- Elementary Science Committee has been formed.
 - 16 teachers (reps from each building & grade level)
- October 20th – 1st meeting
- Goals:
 - Determine current Science teaching practice
 - Reflect on current realities (time, capacity, expertise, etc.)
 - Build awareness/understanding about NGSS
 - Discuss implementation options/timeline
 - Seek out/review NGSS aligned curriculum resources



QUESTIONS?