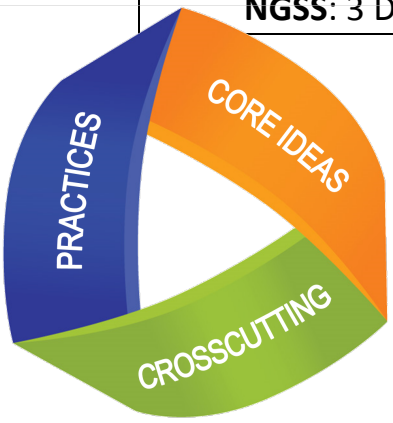

NGSS

Three Dimensions:

1. Practices
2. Crosscutting
3. Core Ideas

_____

NEXT GENERATION SCIENCE STANDARDS For States, By States

http://www.nextgenscience.org/three-dimensions
http://www.nap.edu/openbook.php?record_id=13165
JPlyter Central Middle School 97862

___Dimension 1: Scientific and Engineering Practices

____1. Asking **questions** (for science) and defining **problems** (for engineering)
____2. Developing and using **models**
____3. Planning and carrying out **investigations**
____4. Analyzing and interpreting **data**
____5. Using mathematics and **computational thinking**
____6. Constructing **explanations** (science) & designing **solutions** (engineering)
____7. Engaging in argument from **evidence**
____8. Obtaining, evaluating, and communicating **information**

Notes:

___**Strengthening the engineering aspects** of the Next Generation Science Standards will clarify for students the relevance of science, technology, engineering and mathematics (the four STEM fields) to everyday life.

___**Although engineering design is similar to scientific inquiry, there are significant differences.** For example, scientific inquiry involves the formulation of a question that can be answered through investigation, while engineering design involves the formulation of a problem that can be solved through design.

Dimension 2: Crosscutting Concepts

____1. Patterns, Similarity, and Diversity;
____2. Cause and Effect;
____3. Scale, Proportion and Quantity
____4. Systems and System Models;
____5. Energy and Matter;
____6. Structure and Function;
____7. Stability and Change.

Notes:

___**Crosscutting concepts have application across all domains of science**. As such, they are a way of linking the different domains of science.

___The **Framework emphasizes that these concepts need to be made explicit for students** because they provide an organizational schema for interrelating knowledge from various science fields into a coherent and scientifically-based view of the world.

___Dimension 3: Disciplinary Core Ideas:

Disciplinary Core ideas are grouped in four domains:

____1. Physical Sciences
____2. Life Sciences
____3. Earth And Space Sciences
____4. Engineering, Technology And Applications Of Science

___1. PS: Physical Science:

___**Notes:** The first 3 physical science core ideas answer two fundamental questions—
____1. **"What is everything made of?"** and
____2. "Why do things happen?"

___**Core Idea PS1: Matter and Its Interactions**
___PS1.A: Structure and Properties of Matter
___PS1.B: Chemical Reactions
___PS1.C: Nuclear Processes
___**Core Idea PS2: Motion and Stability: Forces and Interactions**
___PS2.A: Forces and Motion
___PS2.B: Types of Interactions
___PS2.C: Stability and Instability in Physical Systems
___**Core Idea PS3: Energy**
___PS3.A: Definitions of Energy
___PS3.B: Conservation of Energy and Energy Transfer
___PS3.C: Relationship Between Energy and Forces
___PS3.D: Energy in Chemical Processes and Everyday Life
___**Core Idea PS4: Waves and Their Applications in Technologies for Information Transfer**
___PS4.A: Wave Properties
___PS4.B: Electromagnetic Radiation
___PS4.C: Information Technologies and Instrumentation

___2. LS: Life Science

___**Core Idea LS1: From Molecules to Organisms: Structures and Processes**
___LS1.A: Structure and Function
___LS1.B: Growth and Development of Organisms
___LS1.C: Organization for Matter and Energy Flow in Organisms
___LS1.D: Information Processing
___**Core Idea LS2: Ecosystems: Interactions, Energy, and Dynamics**
___LS2.A: Interdependent Relationships in Ecosystems
___LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
___LS2.C: Ecosystem Dynamics, Functioning, and Resilience
___LS2.D: Social Interactions and Group Behavior
___**Core Idea LS3: Heredity: Inheritance and Variation of Traits**
___LS3.A: Inheritance of Traits
___LS3.B: Variation of Traits

___**Core Idea LS4: Biological Evolution: Unity and Diversity**
- ___LS4.A: Evidence of Common Ancestry and Diversity
- ___LS4.B: Natural Selection
- ___LS4.C: Adaptation
- ___LS4.D: Biodiversity and Humans

___3. ESS: Earth Science

___**Core Idea ESS1: Earth's Place in the Universe**
- ___ESS1.A: The Universe and Its Stars
- ___ESS1.B: Earth and the Solar System
- ___ESS1.C: The History of Planet Earth

___**Core Idea ESS2: Earth's Systems**
- ___ESS2.A: Earth Materials and Systems
- ___ESS2.B: Plate Tectonics and Large-Scale System Interactions
- ___ESS2.C: The Roles of Water in Earth's Surface Processes
- ___ESS2.D: Weather and Climate
- ___ESS2.E: Biogeology

___**Core Idea ESS3: Earth and Human Activity**
- ___ESS3.A: Natural Resources
- ___ESS3.B: Natural Hazards
- ___ESS3.C: Human Impacts on Earth Systems
- ___ESS3.D: Global Climate Change

___4. ETS: Engineering, Technology And Applications Of Science

____**Notes:**

___1**. Technology** is any modification of the natural world made to fulfill human needs or desires.

___2. **Engineering** is a systematic and often interactive approach to designing objects, processes, and systems to meet human needs and wants.

___3. **An application of science** is any use of scientific knowledge for a specific purpose, whether to do more science; to design a product, process, or medical treatment; to develop a new technology; or to predict the impacts of human actions.

____**Core Idea ETS1: Engineering Design**
- ____ETS1.A: Defining and Delimiting an Engineering Problem
- ____ETS1.B: Developing Possible Solutions
- ____ETS1.C: Optimizing the Design Solution

____**Core Idea ETS2: Links Among Engineering, Technology, Science, and Society**
- ____ETS2.A: Interdependence of Science, Engineering, and Technology
- ____ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World