|  |  |  |
| --- | --- | --- |
| Classic |  | Three Dimensional |
| Lesson Aim/Essential Question | 🡪 | Essential Question/PE |
| Lesson Intro/Demo (Hook) | 🡪 | Phenomena/Problem/Anchoring Experience |
| Using labs to confirm information | 🡪 | Using labs to construct/build understanding |
| Developing abilities of inquiry | 🡪 | Actively engaged in the SEPs |
| Integrating all areas of science | 🡪 | Emphasizing CCCs |
| Implementing inquiry as instructional strategies, abilities, and ideas to be learned | 🡪 | All three components of 3D learning are important to planning and instruction:**DCI – What I need to know?****SEP – How to explore/apply it?****CCC – Why I learn it?*** Students come to the classroom with conceptual models and explanations about how the world works.
* Students need to develop deep foundations of scientific knowledge, develop understanding of facts, and organize information to make sense of new phenomena.
* Metacognitive approach to teaching and learning can help students take control of their own education.

Metacognition – teaching students how to think about how they think and how they approach learning. |
| Role of Teacher –Direct Instructor | 🡪 | Role of Teacher –Facilitator |
| Students Work Individually | 🡪 | Students Work Collaboratively  |
| Teacher uses technology to deliver information. | 🡪 | Students use technology to enhance understanding. |

|  |  |
| --- | --- |
| EngagePhenomena/Problem/Anchoring Experience | This lesson mentally engages students with an activity or question. It captures their interest, provides an opportunity for them to express what they know about the concept or skill being developed, and helps them to make connections between what they know and the new ideas. |
| Explore Hands-on/Minds-on | Students carry out hands-on activities in which they can explore the concept or skill. They grapple with the problem or phenomenon and describe it in their own words. This phase allows student to acquire a common set of experiences that they can use to help each other make sense of the new concept.  |
| Explain Direct Instruction | Only after students have explored the concept or skill does the teacher provide the concepts and terms used by the students to develop explanations for the phenomenon they have experienced. The significant aspect of this phase is that **explanation follows experience.** |
| Elaborate | This phase provides opportunities for students to apply what they have learned to new situations and so develop a deeper understanding of the concept or greater use of the skill. It is important for students to discuss and compare their ideas with each other during this phase. |
| Evaluate Performance Task/Assessment | The final phase provides an opportunity for students to review and reflect on their own learning and new understanding and skills. It is also when students provide evidence for changes to their understandings, beliefs and skills. |



**Engineering, Technology, and Application of Science**

* ETS1: Engineering Design
* ETS2: Links Among Engineering, Technology, Science and Society

**Earth and Space Science**

* ESS1: Earth’s Place in the Universe
* ESS2: Earth’s Systems
* ESS3: Earth and Human Activity

**NGSS and NYSSLS Planning Guide**

**Life Sciences**

* LS1: From Molecules to Organism: Structure and Processes
* LS2: Ecosystems: Interactions, Energy, and Dynamics
* LS3: Heredity: Inheritance and Variation of Traits
* LS4: Biological Evolution: Unit and Diversity

**Physical Science**

* PS1: Matter and Its Interactions
* PS2: Motion and Stability: Forces and Interactions
* PS3: Energy
* PS4: Waves and Their Applications in Technology for Information Transfer



**NYSSLS Glossary**

**NGSS –** Next Generation Science Standards

**NYSSLS –** New York State Science Learning Standards

**DCI – Disciplinary Core Idea –** What the students need to know? **KNOW**

**Evidence Statements –** Collection of facts related to each topic found on the NGSS website.

**CCC – Crosscutting Concepts –** What will students look for? – have an application across all domains of science. **UNDERSTAND**

**SEP – Science and Engineering Practices –** How will students explore/apply? **UNDERSTAND**

**PE –** Performance Expectation (Top White Box) – What will student understand? **BIG IDEA**

**Bundle -** groups of standards arranged together to create the endpoints for units of instruction.

**Phenomenon -** Something that happens that provides an opportunity to ask questions and conduct research to develop scientific understanding.

**Problem -** A situation that requires a solution often designed and/or constructed by students

**Anchoring Experience –** An opportunity forstudents to experience phenomena in context. (Field Trips)

1. Patterns
2. Cause and Effect: Mechanism and Explanation
3. Scale, Scale Proportion, and Quantity
4. Systems and System Models
5. Energy and Matter: Flow, Cycles and Conservation
6. Structure and Function
7. Stability and Change
8. Asking Questions and Defining Problems
9. Developing and Using Models
10. Planning and Carrying Out Investigations
11. Analyzing and Interpreting Data
12. Using Mathematics and Computational Thinking
13. Construction Explanations and Designing Solutions
14. Engaging in Argument from Evidence
15. Obtaining Evaluating, and Communicating Information

**Phenomenon**

**Problem**

**Anchoring Experience**