



From Seed to Tree Anchor Chart

Three-Dimensional Planning



What is 3-Dimensional Learning?

Three-Dimensional Learning shifts the focus of the science classroom to environments where students use disciplinary core ideas, crosscutting concepts with scientific practices to **explore**, **examine**, and **explain** how and why phenomena occur and to design solutions to problems.

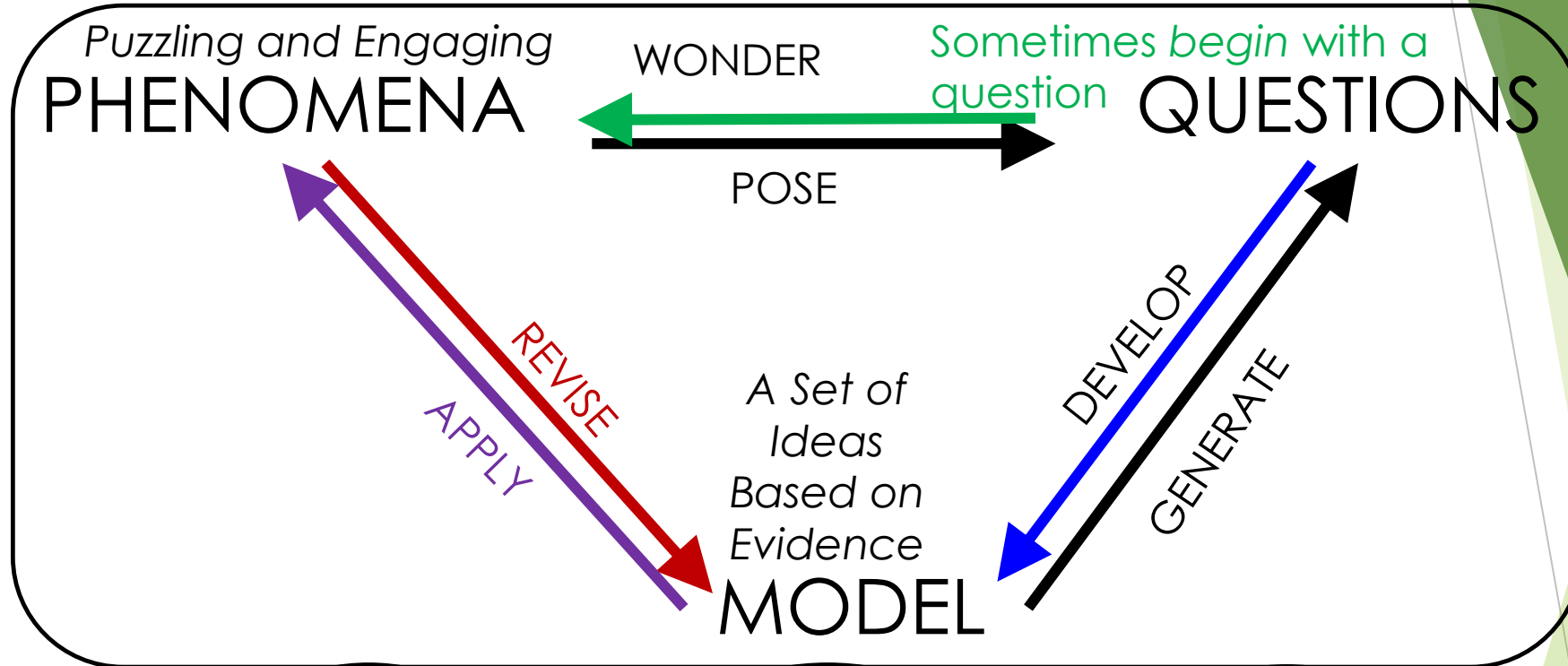
The working together of the three dimensions to **make sense of phenomena and design solutions to problems** is referred to as 3-dimensional learning.

Joe Krajcik, <http://www.activatelearning.com/3-dimensional-learning/>

The Power of Phenomena

- Teachers can provide students with a **shared experience** by using a **common phenomena**.
- These phenomena can be used to develop questions, create models (and use other SEPs), and develop new understandings about DCIs as part of a meaningful cycle.
- “They can act as a starting place for instruction, act as a springboard for curiosity, and ground instructional sequences. But, they can only do this if we harness the wonder in specific ways by asking questions.” A. Beauchamp

Sense-making and Literacy Framework[©]



**PURPOSEFUL
READING**

**PRODUCTIVE
DIALOGUE**

**MEANINGFUL
WRITING**

Using Explanatory Questions

Explanatory ?

- ▶ Questions specifically designed to elicit explanations.
- ▶ The Framework says, “Science begins with a question about a phenomenon, such as “Why is the sky blue?” or “What causes cancer?,” and seeks to develop theories that can provide explanatory answers to such questions. *A basic practice of the scientist is formulating empirically answerable questions about phenomena, establishing what is already known, and determining what questions have yet to be satisfactorily answered.*”

Explanatory ? as a type of Driving ?

- ▶ You may be familiar with the language, driving questions, of which *some* are explanatory - but not all.
- ▶ Driving questions are designed to engage students in a unit of study, but not all expect students to develop explanations. Thus, explanatory questions are a type of driving question.
- ▶ We will use the designation, explanatory question.

Outline of our Steps for 3D Planning

- ▶ Use the **Storyline Coherence Tool** - to map out a few lessons
 - ▶ Use information from when we unpacked the DCI for from "seed to tree"
- ▶ Construct an **anchor chart** that incorporates and maps:
 - ▶ DCI (& associated ELA and Math standards, grades K-5; ELA Standards for Science & Technical Subjects grades 6-12)
 - ▶ SEPs
 - ▶ CCCs
 - ▶ Phenomenon
 - ▶ Vocabulary
 - ▶ Activities or Investigations that allow for:
 - ▶ Text Connections
 - ▶ Literacy Strategies (reading, writing, argumentation, explanation)
 - ▶ Differentiation (think of supports that you can provide)
 - ▶ Assessment



Storyline Coherence Tool

Anchor Phenomenon:

Driving Question(s):

Lesson	Phenomena	Lesson-Level Question	Activities and Concepts	Practices That Students Engage In	What We Figured Out and What Questions We Have	Student Products and How We Know What They Know
1						
2						
3						
4						

Developing a Coherent Explanatory Storyline



Anchor Phenomenon: *A grown tree has tremendous mass compared to the seed from which it came.*

Explanatory Question(s): *Where did the mass come from? How could that happen?*

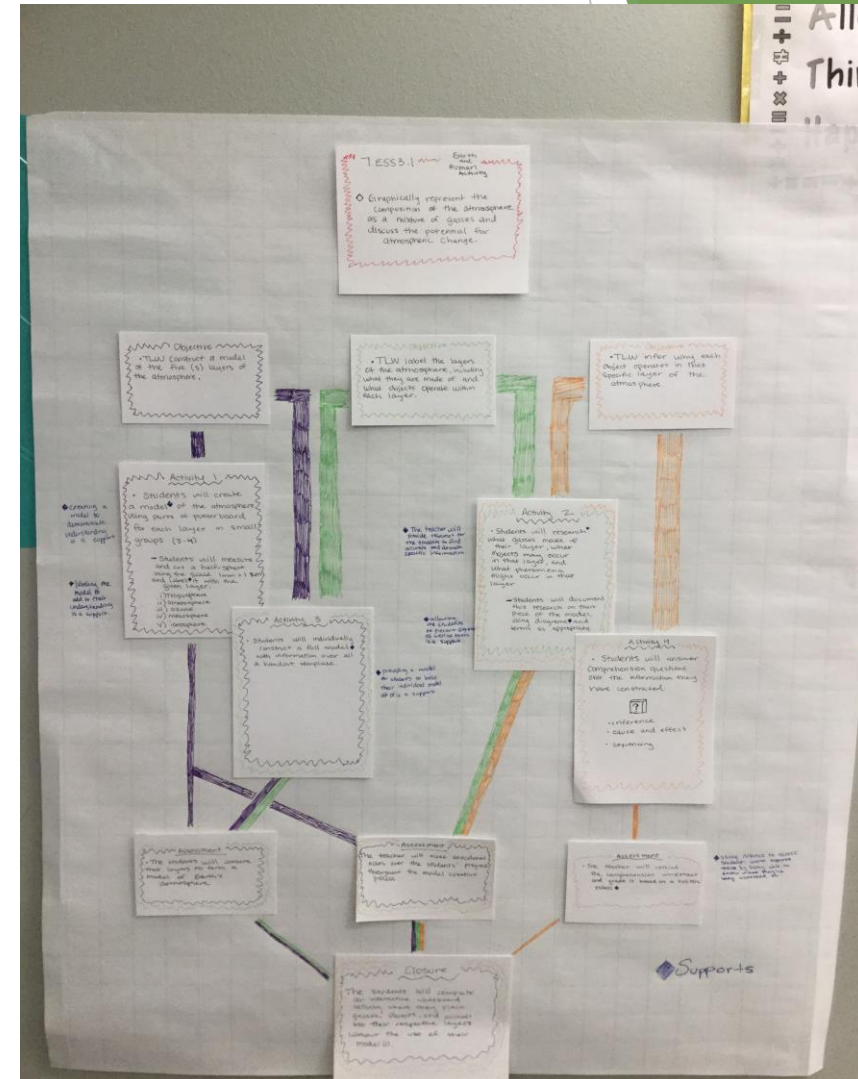
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2						
3						

Information Gathering

- ▶ K-5 Locate relevant ELA & Math standards
- ▶ 6-12 Locate relevant ELA for science & technical subjects
- ▶ What texts can be used to support student learning?
- ▶ What literacy strategies (reading, writing, & dialogue) can be used to support student learning?

Construct Anchor Chart

- ▶ Use Index Cards to add labels and map out your planning.
- ▶ Use arrows/colors to make connections between phenomena, questions, activities/investigations, and assessments.



Anchor Phenomenon &
Explanatory Question

DCI
Unit SEPs
Unit CCCs

ELA/Math Connections

Lesson 1
Lesson Level Question
Phenomena
Objective

Lesson 2
Lesson Level Question
Phenomena
Objective

Lesson 3
Lesson Level Question
Phenomena
Objective

Activity or
Investigation
Lesson SEP and CCC

Activity or Investigation
Lesson SEP and CCC

Activity or
Investigation
Lesson SEP and CCC

Text Connections
Literacy Connections
Supports

Text Connections
Literacy Connections
Supports

Text Connections
Literacy Connections
Lesson SEP and CCC

Assessment

Assessment

Assessment