Supporting Ongoing Changes in Thinking

3 SUPPORTING ongoing changes in students' thinking

- Foster students' deep understandings of core science ideas that can be used to explain a range of natural phenomena
- Help students learn to identify and use various resources for solving problems and developing new knowledge
- Support the development of students' academic language, including talk about generating hypotheses, discussing qualities of evidence, comparing and contrasting models, talking about events in terms of causes and effects, and acknowledging uncertainty about knowledge claims

Planning

Topic/Unit/Anchor Phenomenon

Investigative Phenomenon/Design Problem

Introducing New Science Ideas

Many fundamental science concepts are so abstract, so inaccessible to direct experience, that they have to be represented in various ways to students.
What are the unobservable processes, structures, or events that underlie your phenomena or design problem?

Planning for *Interactive Direct Instruction*

Deciding How Much of the Science You Should Present [pgs. 157-158] Give students enough to reason with. *How much of the science idea needs to be "shared" with students and how much will they need to "figure out"?*

Planning for *Interactive Direct Instruction*

Launching an Episode of Interactive Direct Instruction [pgs. 158-159] *How will you frame the introduction of a new science idea?*
Connect to previous activities: **Position previous students' ideas and questions as important:** **Say how the day's activities can help everyone make progress:** **Introduce key vocabulary in context:** **Provide structure for how students can record or respond to the newly introduced idea:**

Presenting Ideas to Students [pgs. 159-163] *How will you help students think and make meaning along the way?*
Representations of the target idea (diagrams, drawings, graphs, computer simulations, flow charts, maps, physical models, mathematical formulas): **Analogies or metaphors for the idea:** **Multiple examples of the idea in different context:**

Paying Attention to Your Use of Language [pgs. 163-167] Think about how will you communicate. *What strategies will you use during your interactive direct instruction?*

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Activity and Sense Making

Choosing the right activity for the right purpose is essential to support student learning.
What learning activity will students engage in? Why was this activity selected?

Meaningful activities should be selected to support student sense making.
How will this activity support student understanding and allow them to explain events in the real world?

Planning for *Sense Making*

Framing the Activity [pg. 175]
How will you connect this activity to prior classroom learning? How will you describe to students how this activity will advance their thinking about the topic/unit/anchor phenomenon?

Moving Among the Tables: Supporting Insights or Breakthroughs [pg. 175-185]
What ideas or skills will students be wrestling with during this activity?

Back-Pocket Questions (BPQs) support student talk and ongoing changes in student thinking. *What BPQs will you ask?*

Helping students get started:

Pressing further:

Follow-ups:

Collective Thinking

Whole class conversations are crucial for learning because they allow students to hear their peers reason in ways they may never have considered. Creating predictable routines helps students understand how they can contribute.

Planning for *Whole-Class Conversations*

Structuring Whole-Class Conversations [pg. 188-191]
Segment the whole-class discussion into three mini-conversations. **Use the prompts below to create questions for each part of the mini-conversation specific to this activity.**

Patterns or trends - what happened in the activity?

What do we think caused these patterns or observations?

How does the learning from this activity help us think about the Topic/Unit/Anchor Phenomenon?

Using Summary Tables/Charts [pg. 191- 195]
How will students ideas be recorded?

Sample Summary Table/Chart for this activity:

Strategies for Equity and Encouraging Full Participation
What other strategies may be needed to support the learning of all students?