



1. **NGSS Lab** OEL-refined Lessons

Teaching for Conceptual Change

Date:       School:       Grade:

Unit:       Lesson #s

Concepts:

STEM Professional:

Purpose of the revision:

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| Lesson refinements to observe**Effective Science Instruction**:* Elicit students’ initial ideas
* Engage students intellectually with important science content
* Provide opportunities for students to confront their ideas with evidence
* Help students formulate new ideas based on that evidence
* Encourage students to reflect upon how their ideas have evolved
 | Lesson refinements to observe selected **Student Learning Traits**:1. All students engage intellectually in

important science content.1. All students participate in

science discourse with peers(equitable, accountable talk).1. All students use evidence to demonstrate conceptual understanding.
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**2. Concept Development**

**Essential Question**

**Learning target**

**Success criteria**

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| Lesson context (lesson block in the unit)**Monday**      **Tuesday**      **Wednesday**      **Thursday**      **Friday**       |
| **Science Content Study notes for the lesson**       |

**Standards** (*Include both Washington State and NGSS as appropriate)***:**

**3. Teaching for Conceptual Change** *Revised lesson plan*

**Day**       **Observation day [ ]** yes [ ] no

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| **Elicit each student’s initial ideas.** |
| *Find out all the ideas in a class, from earlier science courses and everyday experiences:** *focus question*
* *public record of the ideas*
* *more…*
 |
| Student Thinking*What type of thinking will students be doing during this time?* | Instruction and Assessment*What will the students be doing? The teacher?* *What is being assessed? How is it being assessed?* |

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|  *Student thinking:*     *Anticipated responses:*       | **1. X min 1’s Pre-Assessment of Ideas and Reasoning** Record your prior knowledge and reasoning about: * ***x***

**2. X min class Public Record** Public Record display of whole class’ ideas and reasoning |

**Day**       **Observation day [ ]** yes [ ] no

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| **Prompt possible dissatisfaction with old ideas and surface the range of students’ new ideas that make sense with their new observations.** |
| *Run investigation as designed with instruction moves to support students, such as:** *List class’ range of ideas*
	+ *strengthen those that make sense with new observations and evidence*
	+ *cross off those that do not fit observations and evidence*
* *Record students’ possible dissatisfaction with their original idea – cross items off the public record, when evidence no longer supports an idea*
* *Record students’ ideas that are gaining confidence -- highlight items on the public record when evidence adds support to an idea*
* *Ask questions to assess and guide learning along the way*
* *More…*
 |
| Student Thinking*What type of thinking will students be doing during this time?* | Instruction and Assessment*What will the students be doing? The teacher?* *What is being assessed? How is it being assessed?* |

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| --- | --- |
|  *Student thinking:*     *Anticipated responses:*       | 1. **x min 2’s x .**

xx1. **x min 2’s A/B discourse protocol**

Stop and Think about…* ***x***

**A** and **B** separately write their own ideas that answers the essential question of the lesson. 30 sec **A** tells **B** their idea/reasoning, **B** listens to be able to respond15 sec **B** restates **A**’s key point 30 sec **B** tells **A** their idea/reasoning, **A** listens to be able to respond15 sec **A** restates **B**’s key point |

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| **Day**       **Observation day [ ]** yes  |
| **Narrow the range down to the one new idea, that is most plausible in this situation.** |
| * *Sense making session to find the simplest working model to explain all the current observations and evidence.*
* *Resolve new science understanding via:*
* *think alone*
* *diagram the model*
* *write scientific explanation*
* *make a public presentation*
* *More…*
 |

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| Student Thinking*What type of thinking will students be doing during this time?* | Instruction and Assessment*What will the students be doing? The teacher?* *What is being assessed? How is it being assessed?* |

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| --- | --- |
|  *Anticipated responses:* *Students who are not understanding the concept*      *Students who are developing the concept (partial or fragile understanding)*      *Students who understand and are applying the concept*       | 1. **x min 2’s x .**

xx |

**Day**       **Observation day [ ]** yes [ ] no

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| **Reflect back to initial ideas on how students’ conceptual understanding has changed.** |
| *Reflective writing prompts to track progress towards and build confidence about the learning target.** *“Stop and think about our learning target … “*
* *Write about your science learning using these sentence starters:*
	+ *“ I used to think… but now I know… because I have evidence…”*
	+ *“ I still wonder...”*
* *More…*
 |
| Student Thinking*What type of thinking will students be doing during this time?* | Instruction and Assessment*What will the students be doing? The teacher?* *What is being assessed? How is it being assessed?* |

|  |  |
| --- | --- |
|  *Anticipated responses:* *Students who are not understanding the concept*      *Students who are developing the concept (partial or fragile understanding)*      *Students who understand and are applying the concept*       | 1. **x min Reflective Writing**
* ***“Stop and think about our learning target … “***
* ***Write about your science learning using these sentence starters:***

***“ I used to think… but now I know… because I have evidence…”*** ***“ I still wonder...”*** |

**Day**       **Observation day [ ]** yes [ ] no

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| **Apply the new idea to test how it holds up in new situations.** |
| * *Prompt to record how the class idea-working working model -- holds up, or whether it still needs more information and refinement.*
* *Application to compare own working model, or idea, with another test situation.*
* *More…*
 |
| Student Thinking*What type of thinking will students be doing during this time?* | Instruction and Assessment*What will the students be doing? The teacher?* *What is being assessed? How is it being assessed?* |

|  |  |
| --- | --- |
|  *Anticipated responses:* *Students who are not understanding the concept*      *Students who are developing the concept (partial or fragile understanding)*      *Students who understand and are applying the concept*       | 1. **x min x**

***x*** |

**4. Observations: collecting the evidence of learning**

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| **Effective Science Instruction**:* *Elicit* students’ initial ideas
* *Engage* students intellectually with important science content
* Provide opportunities for *students to confront* their ideas with evidence
* Help students *formulate new ideas* based on that evidence
* Encourage students to *reflect* upon how their ideas have evolved
 |
| **Student Learning Traits** | **Data to Collect for** **Evidence of Student Learning** | **5Dimensions** | **NGSS Science and Engineering Practices**  |
| All students are intellectually engaged with important science content. | Record time on task for thinking, writing, verbalizing:[ ]  #of students engaged[ ]  # of minutes students are engaged[ ]  exact student quotes[ ]  What lesson refinements that led to further engagement?[ ]        | Teacher asks probing questions uses strategies and provides multiple points of entry that build upon student learning and engages all students. | Asking questions and defining problems; Constructing explanations |
| All students participate in equitable scientific discourse.  | Diagram the conversation, tally seconds/minutes, record statements:[ ]  draw a diagram (How did the conversation move around a group)[ ]  assess if and how was equal “airtime” was achieved in each group[ ]  ratio of minutes - students discussing science: teacher discussing science (goal is > 80:20)[ ]  Which teacher prompts supported specific students?[ ]        | Teacher uses student talk strategies so students may reflect on evidence to support new ideas. | Obtaining, evaluating, and communicating information |
| All students use evidence to support or refute scientific claims.  | Sort the student work into stacks[ ]  # of students students producing where reasoning matched the evidence and claim[ ]  # of pieces of evidence each student cited [ ]        | Teacher provides opportunities for student to take ownership so one may support his/her arguments and new ideas. | Engaging in argument from evidence |

**5. Generalizations to Practice** *insert into booklet—Teaching for Conceptual Change*

TITLE      date      PLC team

**Student Learning Expected**

**Instruction Details**

**Multiple Representations of Key Concept** graphic/numeric/symbolic/verbal

**Links to Research** How People Learn      Cognitive Demand

**Samples of student work on back of card**

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**Samples of student work on back of card**

**Student Handouts/Materials**

Insert supporting resources here (pictures, student sheet copy masters, etc.):