Examine Student Thinking Protocol

Purpose: To collaboratively explore student work to:

- Investigate research into learning a specific scientific concept,
- Examine students' thinking about that concept,
- Differentiate instructional actions for different levels of understanding. **Time: 120 min (2hr)**

Time	Process	Roles and Responsibilities
Step 1 5 min	<u>Roles</u> Before looking at the student work, choose a **facilitator**, a **timekeeper**, and a **recorder.**	Refer to role descriptions for individual responsibilities. *Timekeeper*: Note the time at which final reflection must begin (Step 8). **Tool**: **Participant Roles Sheet**
Step 2 5 min	<u>Reading the Probe – Self Questioning</u> • Read the assessment probe and answer it yourself. • Silently answer the Protocol Support Questions - 1A, 1B, and 1C (they should be on the back of the assessment probe).	*Facilitator:* Remind group of the norm of silence. *Timekeeper:* Hold group to time indicated in the protocol. **Tools: Assessment Probe with 'Protocol Support Questions' printed on back**
Step 3 10 min	<u>Probe Clarification</u> • Read the "Scientist's Ideas" (explanation for scientifically accepted thinking about probe) **Discuss:** • What is the scientific explanation? • What ideas does this probe "uncover?"	*Facilitator:* Ensure that participants focus on the topic with concise comments. *Timekeeper:* Hold group to time indicated in the protocol. **Tools**: **'Connect to Research' handout**
Step 4 25 min	<u>Connection with Standards</u> • Choose appropriate Curriculum Topic Study Guide(s) from pages IX and X of the Science Curriculum Topic Study Book. • Choose resource and read section indicated in CTS Guide. • Record relevant ideas from national standards and resources on the bottom of Connect to Research handout. • Share relevant ideas from the selected resource with the rest of the group.	*Facilitator***:** Help group members select appropriate Curriculum Topic Study guide as well as resource to examine (Benchmarks, National Science Education Standards, etc.). Keep group moving through sharing ideas from the resources. *Timekeeper*: Check that group spends no more than 25 minutes on this topic. **Tools**: **'Connect to Research' handout,** **CTS guides, other Research on Learning materials**

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Step 5 15 min	Data-Driven Dialogue • On back of the probe, silently write your answer to question 4A. (2 min) • Share individual responses at your table. (2 min per person) • On back of the probe, silently write your answer to question 4B. (2 min) • Share individual predictions at your table. (2 min per person) **No analysis yet! Just the prediction.**	*Facilitator*: Ensure that each person gets to share and that group sticks to the questions given. Make sure group knows that **no analysis** is needed in question 4B, **just the prediction.** *Timekeeper*: Hold group to time indicated in protocol. *Recorder*: Record participant answers to question 4A and 4B on Recorder Notes. **Tools**: 'Support Protocol Notes, Recorder Notes
Step 6 15 min	Quick Scan of Student Work • Take 5 minutes to scan through the packet of student work and select 2 samples of student thinking that interest you. • Each member takes 2 minutes to share what was surprising or interesting in their 2 samples. **No sorting or analysis yet! Just the surprises or interesting responses.**	*Facilitator*: Pass out student work packets. Ensure that each person gets to share but does not begin sorting or analyzing. *Timekeeper*: Hold group to time indicated in protocol. **Tools**: **Student work packets**
Step 7 25 min	Using H-M-L to Analyze Student Work ● Individually sort student work into 3 piles to indicate high, medium, and low. (Use H-M-L Grid). **Note the trends or patterns you see in the students' thinking in space at bottom of the grid.** ● Record results: Each person calls out what they gave each numbered paper (H-M-L). **Analysis** Discuss: ● Discrepancies and commonalities in sorting of student work. ● Criteria for sorting student work and agree on necessary criteria for high, medium, and low conceptual understanding. ●How does student understanding compare with the research you read in step 3? ●Were there any ideas not described in the research that you found to be common in your students' work?	*Facilitator*: After each person has sorted student papers individually, have each member call out how they sorted each paper. *Recorder*: Use "Group sort" on the Recorder Notes, or other suitable format to display results. *Facilitator*: Facilitate discussion so group can reach consensus on criteria for sorting student work and analyze student understanding. *Recorder*: Record criteria for H-M-L on recorder notes. *Timekeeper*: Keep people moving through this process, 25 minutes total. **Tools**: **Student work packets, H-M-L Grid, Recorder Notes**

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Step 8 20 min	Final Analysis Discuss: ● How do the results from step 6 inform classroom instruction? ● What instructional strategies could help the **Low** students understand the concepts better? ● What instructional strategies could lead **Medium** students to a more complete conceptual understanding? ● What instructional strategies could help challenge the **High** students?	*Facilitator*: Make sure that each member has the opportunity to respond to each question. *Recorder***:** Summarize the suggestions of the group beneath each question on Recorder Notes, Step 7. *Timekeeper***:** Make sure group addresses all four questions during this 20 minutes. **Tools**: **Recorder Notes**

Materials	Sources
Participant Role Sheet	www.ncosp.wwu.edu ↓ Collaboration ↓ Looking at Student Work ↓ Examine Student Thinking Protocol
Assessment Probe with 'Protocol Support Questions'	
'Connect to Research' Handout	
H-M-L Grid	
Recorder Notes	
Curriculum Topic Study (CTS) guides	Keeley, Page. (2005). *Science curriculum topic study: Bridging the gap between standards and practice.* Thousand Oaks, CA: Corwin Press.
Student work packets	TBA

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