Module and Lesson Study

Participant Handout

Module Study Protocol

Introduction

PhD Science Texas® modules are organized around compelling phenomena and a series of questions that build students' knowledge and skills. The Module Study Protocol provides educators with a replicable process to help them understand the module's focus, organization, and elements before teaching it.

Directions

Complete the process independently or with grade-level colleagues.

Materials

- Teacher Edition
- Science Logbook
- a notepad and pen or a device (to record responses)
- sticky notes or highlighters in multiple colors (to annotate)
- additional copies of Appendix A: Module Storyline (optional for annotative purposes)

Preview the Learning

Step 1: Explore the Module Content and Ideas	Guiding Questions	Resources	Notes
A. Read the Introduction in the Module Overview. ▪ Identify the anchor and supporting phenomena for the module.	▪ What scientific understanding do students build by studying the anchor and supporting phenomena?	▪ Module Overview—Introduction	
B. Study the questioning structure. ▪ Identify the Essential Question, Focus Questions, and Phenomenon Questions that students explore throughout the module. ▪ Use the Enduring Understanding, Concept Statements, and Knowledge Statements to answer the guiding questions.	▪ How do the Focus Questions work together to build a coherent understanding of the Essential Question? ▪ How does exploring the Phenomenon Questions help students answer the Focus Questions?	▪ Module Overview—Module Map ▪ Module questioning structure	

Step 2: Identify the Module Focus Standards	**Guiding Questions**	**Resources**	**Notes**
A. Examine the Focus Standards.	▪ How does exploring the anchor phenomenon help students develop the targeted science ideas? (Content Standards) ▪ What scientific and engineering practices do students use to develop an understanding of the targeted science ideas? (Scientific and Engineering Practices, or SEPs) ▪ What recurring science concepts do students apply to uncover the targeted science ideas? (Recurring Themes and Concepts, or RTCs)	▪ Module Overview—Focus Standards	
B. Read the Building Content Knowledge section in the Module Overview.	▪ How are students building content knowledge as they navigate through each concept in the module?	▪ Module Overview—Building Content Knowledge ▪ Spotlight Lessons: Overview—Building Content Knowledge	

Step 3: Examine the Module Assessments	**Guiding Questions**	**Resources**	**Notes**
A. Examine the End-of-Module Assessment (EOMA) and the EOMA rubric. ▪ Review the EOMA by taking the assessment or by looking at the sample student responses. ▪ Explore the EOMA rubric.	▪ How do students demonstrate their understanding? What evidence do you see of students applying science knowledge (Content Standards), scientific and engineering practices (SEPs), and recurring science concepts (RTCs)?	▪ EOMA and EOMA rubric ▪ Module Overview—Focus Standards	
B. Examine the Conceptual Checkpoints.	▪ What connections exist between the Conceptual Checkpoints and the EOMA?	▪ Conceptual Checkpoints ▪ EOMA and EOMA rubric	

Investigate the Development of Learning

Step 4: Determine the Module Investigations	Guiding Questions	Resources	Notes
A. Examine the anchor visual progression. ▪ Identify the anchor visual updates for each concept in the module.	▪ What are the critical components of the anchor visual updates? ▪ How do students progress toward answering the Essential Question?	▪ Appendix A: Module Storyline	
B. Analyze the learning progression in the module. ▪ Consider these questions one concept at a time.	▪ What question are students exploring? ▪ What investigations and activities are students engaging in? ▪ What are students figuring out? ▪ How does what students figure out connect to other learning? ▪ How does it connect to previous learning? ▪ How does it move or drive the learning forward?	▪ Appendix A: Module Storyline	

Prepare for Instruction

Step 5: Deepen the Learning and Preparation	Guiding Questions	Resources	Notes
A. Leverage student strengths and anticipate barriers.	▪ How can your students leverage their strengths? ▪ What barriers may exist for your students within the module's content? How will you support access to the content for students who have gaps in background knowledge? ▪ How will you support students in building a coherent understanding of the science content? ▪ How can you use local or culturally relevant phenomena to support students?		
B. Prepare the necessary materials and plan for materials management.	▪ What materials are needed? ▪ What advance materials preparation needs to occur? ▪ What is your materials management plan/ routine?	▪ Module Overview—Advance Materials Preparation ▪ Module Resources ▪ Great Minds Digital Platform: Materials List ▪ Great Minds Digital Platform: Preparation Guide	

C. Consider pacing needs and how to address pacing obstacles.	▪ How many days are allotted for the module and each lesson set? ▪ What pacing concerns need to be addressed when planning a lesson set? ▪ Optional: How does the pacing for this module compare to state or district pacing guides?	▪ Module Overview—Module Map ▪ Spotlight Lessons: Overview—Module Map	
D. Engage in any additional study you need to be fully prepared.	▪ What questions do you have about the science? ▪ What additional resources or information do you need to feel fully prepared to teach the module?	▪ Module Overview—Additional Reading for Teachers	

Assessment Analysis

Complete the graphic organizer as you move through each step in the assessment analysis process.

Evidence of Science Ideas (Content Standards)	Evidence of Scientific and Engineering Practices (SEPs)	Evidence of Recurring Science Concepts (RTCs)	Connections Between Assessments

Anchor Visual Analysis

List or draw the critical component of each anchor visual update.

	Anchor Chart	Anchor Model	Driving Question Board
Concept 1			
Concept 2			
Concept 3			
Concept 4			

Start–Stop–Keep–Tweak

Start	Stop	Keep	Tweak
Something I would like to start doing is …	Something I currently do that I would like to stop doing is …	Something I currently do that I would like to keep doing is …	Something I currently do that I want to tweak is …

Lesson Study Protocol

Introduction

Each module has several lesson sets, or series of lessons that work together. Each lesson set includes a Phenomenon Question, which helps students build the knowledge and skills they need to answer the module's Focus Questions and Essential Question and to complete the End-of-Module Assessment.

The Lesson Study Protocol is a replicable process that helps educators understand the key student actions in a lesson set and how those key actions help students build the knowledge and skills they need to respond to the lesson set's Phenomenon Question and Checks for Understanding.

Directions

Complete the process independently or with grade-level colleagues. This process is a continuation of the Module Study Protocol.

Materials

- Teacher Edition
- Science Logbook
- a notepad and pen or an electronic device (to record responses)
- sticky notes or highlighters in multiple colors (to annotate)

Preview the Learning

Step 1: Explore the Lesson Set Content and Ideas	**Guiding Questions**	**Resources**	**Notes**
A. Read the Prepare section. ▪ Identify the Phenomenon Question. ▪ Note the Knowledge Statement and the lesson objectives.	▪ What science understanding do students develop by the end of this lesson set? How does this new understanding build toward their explanation of the anchor phenomenon? ▪ How will exploring the Phenomenon Question help students build a coherent understanding of the Focus Question?	▪ Prepare section	
Step 2: Identify the Lesson Set Standards Addressed	**Guiding Questions**	**Resources**	**Notes**
A. Examine the Standards Addressed.	▪ How does exploring the anchor and supporting phenomena develop the targeted science ideas? (Content Standards) ▪ How do students use scientific and engineering practices to develop an understanding of the module's science ideas? (Scientific and Engineering Practices, or SEPs) ▪ How do students apply recurring science concepts to uncover the module's science ideas? (Recurring Themes and Concepts, or RTCs)	▪ Prepare section—Standards Addressed	

Step 3: Examine the Lesson Set Assessments	**Guiding Questions**	**Resources**	**Notes**
A. Examine the Checks for Understanding. ▪ Locate and read the Checks for Understanding in the lesson set.	▪ What evidence do you see of students applying science ideas (Content Standards), scientific and engineering practices (SEPs), and recurring science concepts (RTCs)? ▪ Why are the science ideas (Content Standards), scientific and engineering practices (SEPs), and recurring science concepts (RTCs) in the Check for Understanding important to formatively assess?	▪ Checks for Understanding (inline and sidebar)	
B. Make connections to the Conceptual Checkpoint and the End-of-Module Assessment (EOMA).	▪ How do the Checks for Understanding connect to the Conceptual Checkpoint and the EOMA?	▪ Conceptual Checkpoint ▪ EOMA and EOMA rubric ▪ Checks for Understanding	

Investigate the Development of Learning

Step 4: Determine the Lesson Set Investigations	Guiding Questions	Resources	Notes

A. Analyze the learning progression.
 	
▪ Identify student-generated questions that connect to exploration of the phenomena in this lesson set.
	▪ What question are students exploring?
	
	▪ What investigations and activities are students engaging in?
	
	▪ What are students figuring out?
	
	▪ How does what students figure out connect to other learning?
	
	  ▪ How does it connect to previous learning?
	
	  ▪ How does it move the learning forward?
	
	▪ How does what students figure out connect to the anchor visual updates in the concept?
		▪ Appendix A: Module Storyline
		
		▪ Lesson pages
		
		▪ Classroom anchor visuals: anchor model, anchor chart, driving question board	

Prepare for Instruction

Step 5: Deepen the Learning and Preparation	Guiding Questions	Resources	Notes
A. Plan for each lesson in the lesson set. ▪ Complete the lesson's investigations prior to facilitating with students.	▪ What student-generated questions are explored and answered? What new questions might students develop because of the lesson? How might those new questions motivate the next lesson and connect to other learning? ▪ How can you support students while maintaining rigor and keeping instruction student-driven? ▪ How will you support students in building a coherent understanding of the science content and understanding the purpose behind the lesson's investigations? ▪ How do the lesson's questions move students toward answering the Phenomenon Question and achieving the lesson's objective? ▪ Are there any parts of the lesson that you need to practice prior to facilitating this lesson with students?	▪ Lesson pages, including Just-in-Time notes ▪ Science Logbook ▪ Great Minds Digital Platform: Pacing Guide ▪ Great Minds Digital Platform: Investigation Videos for Students	

B. Prepare the necessary materials and plan for materials management.	▪ What materials are needed? ▪ What advance materials preparation needs to occur? ▪ What is your materials management plan/ routine? ▪ How can you plan to overcome any environmental barriers that may exist for students?	▪ Great Minds Digital Platform: Investigation Videos for Teachers ▪ Module Resources ▪ Great Minds Digital Platform: Materials List ▪ Great Minds Digital Platform: Preparation Guide	
C. Consider pacing needs and how to address pacing obstacles.	▪ How can you maximize instructional time while honoring the curriculum's intentional design and structure? ▪ Optional: How does the pacing for this lesson set compare to state or district pacing guides?	▪ lesson pages ▪ Great Minds Digital Platform: Pacing Guide	
D. Explore connections to other content areas. ▪ Identify any mathematics or English language arts (ELA) skills and knowledge students may need to apply.	▪ How can you leverage the coherence between content areas to support and/or accelerate student learning? ▪ How can you ensure coherence between content areas? How can you ensure these mathematics and ELA connections are coherent from the student perspective?	▪ lesson pages, including Just-in-Time notes ▪ district, state, or national mathematics and ELA resources ▪ Mathematics and/or ELA curricula	

Lesson Planning Template

Connections Between Knowledge Statement and Objective				
Check for Understanding Task				
Materials Preparation				
Lesson Component	**Estimated Time**	What are students doing, and what science ideas are they figuring out? (Key activities and products)	How do these ideas help them meet the standards and lesson objective, understand the Knowledge Statement, and answer the Phenomenon Question?	How can I support students while maintaining rigor and keeping instruction student-driven?
Launch				
Learn				
Land				

Post-Lesson Reflection

What went well?

What are some opportunities for growth?

How will the outcome of this lesson affect the next lesson? How will you account for these effects in the next lesson?

How will this change how you plan and teach future lessons?

How will you teach this lesson differently next time?

Work Time Choice Board

Below are the instructions and information you need to complete the task of your choice.

Additional Planning Time

Continue lesson planning for the first lesson set in your upcoming module, or use the Lesson Study Protocol to plan for the next lesson set in your current module.

Deliberate Practice

Purpose

- Engage in repetition to develop automaticity.
- Break up the task into manageable parts.
- Receive feedback as "practice makes permanent."
- Practice an uncomfortable part of the lesson to become more comfortable before facilitating that lesson with students.

Preparation

- Form groups of two or three.
- Determine which group member will go first.
- Identify which part of an upcoming lesson you would like to practice and why.

Procedures

- Facilitate: Acting facilitators facilitate their selected part of the lesson as they would in the classroom.
- Give Feedback (Praise, Push): Group members give feedback in the form of praise and at least one push.
- Call Your Shot ("I will …"): Facilitators call their shot for improvement with an "I will …" statement.
- Re-facilitate: Facilitators have an opportunity for direct improvement by re-facilitating and implementing the shot they called moments ago.

Continue the Investigate the Development of Learning Activity

Continue any unfinished work from earlier in the session, or expand on our previous work to include other concepts from your current module.

Explore Other *PhD Science Texas* Resources

Below are a series of links and a table to help you explore other *PhD Science Texas* resources that are available to implementers. As you explore each resource, consider its value and how you would like to use it to support your implementation.

Video Library

1–2–3 Reflection

Reflect on what you learned during the session. Use this reflection to set goals and establish a goal-oriented plan.

One goal I have is ...

Two steps I can take that will help me achieve my goal are ...	

Three resources that will support my journey are ...		

Blank Graphic Organizers

Use the blank graphic organizers below when planning for your next module and lesson set.

Module _____ Concept _____

How will exploring the Focus Question help students answer the Essential Question?	
How do students progress toward answering the Essential Question?	

Lesson Set	What questions are students exploring?	What investigations and activities are students engaging in?	What are students figuring out?	How does this connect to other learning?

Evidence of Science Ideas (Content Standards)	Evidence of Scientific and Engineering Practices (SEPs)	Evidence of Recurring Science Concepts (RTCs)	Connections Between Assessments

	Anchor Chart	Anchor Model	Driving Question Board
Concept 1			
Concept 2			
Concept 3			
Concept 4			

Lesson Planning Template

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Check for Understanding Task				
Materials Preparation				
Lesson Component	**Estimated Time**	What are students doing, and what science ideas are they figuring out? (Key activities and products)	How do these ideas help students meet the standards and lesson objective, understand the Knowledge Statement, and answer the Phenomenon Question?	How can I support students while maintaining rigor and keeping instruction student-driven?
Launch				
Learn				
Land				

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How will this change how you plan and teach future lessons?

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