

Integrated Curriculum Topic Study & Lesson Study Tools

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Advancing science learning and teaching for all

This document consists of tools designed to guide a group of teachers through the process of carrying out and integrating curriculum study and lesson study. Lesson study, developed and well-established in Japan and now spreading in the United States, is a form of professional development grounded in classroom practice that seeks to gradually improve student learning through reflection on teaching practice. Curriculum topic study (CTS) is a systematic process for bringing together the standards (national and state), content knowledge, and research on student learning surrounding a specific curricular topic.

The tools (Goal Selection and Roadmap) consist of sequenced questions and exercises that serve as a guide for your group's work. This is intended to help participants to gain maximum benefit from the process. As you proceed through these tools, you will be expected to generate and turn in a written record of this work. An electronic template will be provided to help with this task. Facilitators will be available to support your efforts. While using the tools, you will encounter key locations where you will be required to discuss your work with a facilitator.

Through using these tools, you ultimately will complete a student centered research lesson that incorporates appropriate content, best teaching practices, and standards. Through implementing the research lesson, the group will collect student learning data that will inform future science teaching.



Goal Selection

OVERVIEW

This tool is designed to serve as an anchor for members of a group undergoing the process of Science Curriculum Topic Study and Lesson Study. Through engaging in discussions and providing answers to the questions below, the group will be able to maintain their focus on student learning. It is intended that you refer back to the work produced by this tool often. Given the nature of this preparation process, different groups will move at different rates. As you progress through the tool, record the consensus ideas of the group in writing. An electronic template is available.

Group Information

Name and Contact Information for all group members.

Establish and Record Group Norms

These will be the standards of behavior that you wish to govern your work as a group (e.g., listen before responding, focus on task at hand).

Select a Goal for the Group

As a group, discuss and answer, in writing, each of the following questions. Answers should be concise.

1. What aspirations do you have for your students? What qualities do you want your students to have by the time they leave your school? What kinds of learning behaviors do you want them to exhibit?
2. What gaps do you see between these aspirations and how children are actually developing at your school?
3. As a group, select a gap that you would like to focus on with your Lesson Study.
4. Write a group goal that states the quality you would like to develop in your students. The goal must address the gap you selected above.

Discuss your results with a facilitator

Select a Research Lesson

The research lesson will serve as the context for your work with Lesson Study. You will use the text “Science Curriculum Topic Study” (SCTS)¹ to help develop the research lesson and to connect this lesson to the unit and curriculum. The emphasis is to generalize what is learned from this research lesson to your practice as teachers of science. The following steps serve as a guide in selecting a lesson for research.

1. Think about the curriculum that you currently use. Consider a major science topic within your curriculum. The topic you select should be one in which the group goal can be addressed and must be a big idea represented in SCTS. Use the index in SCTS to find the pages (pp. 113-271) that addresses this curricular topic. List the topic and page number from SCTS.
2. Identify the curricular kit or unit that you will use to teach this topic.
3. Decide upon a lesson from the kit or unit that will be developed for Lesson Study. This will be the primary context for your research.

Once you have completed the steps above, discuss your results with a facilitator. Then move on to “Integrated Curriculum Topic Study and Lesson Study Tools”. An electronic version of the tool is available.

Discuss your results with a facilitator

This document is adapted from a document entitled *Lesson Study: Group Goal Selection* (© 2002) by Barbrina Ertle, Sonal Chokshi, and Clea Fernandez of the Lesson Study Research Group at Columbia University. We are grateful for their permission to modify and adapt their materials. The Lesson Study Research Group web site URL is: <http://www.tc.edu/lessonstudy>.

¹ “Science Curriculum Topic Study” Keeley P. (2005) Thousand Oaks, California. NSTA Press and Corwin Press

Roadmap Outline

I. Background information

II. Unit information

- A. Unit details
- B. Background information for the unit
- C. Goal(s) of the unit
- D. How the content for the unit fits into the curriculum
- E. How the study lesson fits into the unit

III. Lesson Information

- A. Name of the study lesson
- B. Background information for the study lesson
- C. Goal(s) of the study lesson
- D. How the study lesson is related to the group goal
- E. Process of the study lesson

Steps of the lesson: learning activities and key questions (and time allocation)	Student activities/ expected student reactions or responses	Teacher's response to student reactions/ things to remember	Goals and method(s) of evaluation	Observation notes

- F. Lesson implementation logistics
- G. Evaluation
- H. Appendix

Roadmap²

This tool is designed to help you perform curriculum topic study and develop a research lesson for Lesson Study. It is organized by sections, each focusing on a particular aspect of the lesson or its context. Each section contains a list of guiding questions for you to address. Commentary is provided to clarify these guiding questions. Keep in mind that the list of provided questions is not meant to be comprehensive, but rather, to give you an idea of key issues that you should be thinking about. Many other questions or issues are likely to surface as your group goes through this process. These issues should also be incorporated into the appropriate sections below.

I. Background information

Using the previous tool (Goal Selection), you formulated a Lesson Study goal and selected a research lesson through which you will examine how that goal can be accomplished. In this section you describe the classroom and school context that is the backdrop for the research lesson.

Include all background information that your colleagues will need in order to observe the lesson and participate in the lesson study process. For example, you should describe the student learning goals for the lesson. You may want to include information regarding what your students know coming into the lesson and how the lesson is important to their future learning. Describe any teaching techniques and approaches that you will be exploring with this lesson. The bulleted questions below may serve to guide your thinking. Consider them in any order and note that you are not limited to only these questions.

First, go through the questions on your own. Make detailed notes on a separate sheet so you can describe your ideas to the group later. Spend about 30 minutes on this individual reflection.

Then reconvene the group to identify the common elements in the individual responses as well as any outstanding differences. The consensus responses that emerge from the group discussion are what you should enter into the group's CTS/LS Roadmap.

- Why is this science content well suited to addressing the group goal of Lesson Study?
- What do you hope to learn from this lesson that will inform your practice more generally?
- What are the goals for your students' learning and intellectual development in this lesson?
- What do the observers need to know about your classroom?
- What learning or problem solving strategies are my students familiar or comfortable with up to this point?
- What misconceptions do your students have coming into this lesson?
- What should students know at the end of this lesson? What else would you like them to gain from this lesson?
- Are there any teaching techniques or approaches that are central to the design of this lesson?
- What administrative support or involvement do you need to insure the success of this research lesson?

Discuss your results with a facilitator

²This document is adapted from a document entitled *A Tool for Planning and Describing Study Lessons* (© 2001) by Barbrina Ertle, Sonal Chokshi, and Clea Fernandez of the Lesson Study Research Group at Columbia University. We are grateful for their permission to modify and adapt their materials. The Lesson Study Research Group web site URL is: <http://www.tc.edu/lessonstudy>.

II. Unit information

In this section, your group will analyze the unit in which the research lesson is embedded. The group focus is to examine the learning goals of the unit, the instructional sequence of the unit, and how the unit connects to other parts of the curriculum. Throughout this section your responses need to be based on group discussion. You will need to consult several references, starting with the text “Science Curriculum Topic Study” (SCTS). Before starting this section consult the guiding questions on pp. 37-39. These questions may assist you in using the Curriculum Topic Study Guides to analyze the unit. (The Curriculum Topic Study Guides are found in Chapter 6 of SCTS.)

A. Unit details

1. Title of Unit
2. Unit References/Citations (Publisher, Curriculum, Kit, etc.)

B. Background information for this unit

Here you will document the content and pedagogical knowledge necessary to teach the unit and lesson.

1. Provide the page references(s) from SCTS for the Curriculum Topic Study Guides that addresses the unit.
2. Summarize the adult content knowledge required for this unit. See section I of the appropriate Curriculum Topic Study Guide(s) (CTSG) for page numbers in the references *Science for All Americans, Benchmarks, etc.*
3. Summarize the Instructional Implications for this unit. See section II of your CTSG.

C. Goal(s) of the unit

This is a description of the learning goals for the unit.

1. Identify and list the science content and process goals of this unit. See Section III of your CTSG Guide(s) for page numbers in the references *Science for All Americans, Benchmarks, etc.*
2. How does the unit promote depth of understanding of key concepts and ideas?
3. How does the content connect to the background, experience, and needs of the students?
4. Examine and summarize the research on student learning for this topic. See Section IV of your CTSG.



Discuss your results with a facilitator

D. How the content for the unit fits into the curriculum

This is a description of how the content that is taught in this unit relates to content taught in previous and future grades as well as this grade. It should include the specific concepts that are taught in those grades, and how they relate to the concepts taught in this unit. A curriculum guide may provide you with this information, but take some time to think about and discuss how everything relates, and the importance of an appropriate development of concepts. So that this task does not become unwieldy, include only highly relevant concepts in this description. See Section V (Coherency and Articulation) of your CTSG for background to provide answers to some of the questions below.

1. What prior student knowledge is necessary to learn the content that this unit focuses on?
2. What new student knowledge can be developed from the concepts that students will learn in this unit?
3. Describe the relationship of EALR's to your topic. What GLE's are addressed in this unit? How does this unit fit in the district curriculum?

E. How the study lesson fits into the unit

1. Outline the instructional sequence of the unit. Briefly identify the topics covered and the number of lesson spent covering each topic. Be sure to indicate where the research lesson falls in this sequence.
2. Will any of the concepts and/or skills in your planned lesson get addressed at other points in the unit?

Discuss your results with a facilitator

III. Lesson information

In this section you focus in on the specific lesson that forms the primary context for your research. You will first articulate the teacher and student knowledge required for the lesson and the student learning goals of the lesson. Keeping in mind the group's lesson study goal, you will develop a detailed outline of the instructional sequence of the research lesson.

A. Name of the study lesson

B. Background information for the study lesson

1. Review and summarize the adult science content required for this lesson (refer to Section II.B).
2. What prior student knowledge and skills are required for this lesson? (Refer to Section II.D).

C. Goal(s) of the study lesson

This is a description of the goals for this individual lesson. You may include specific strategies, skills, or ways of thinking about science you would like to address. Use the information you have organized in Section II together with the text "Science Curriculum Topic Study"(SCTS) to complete this section.

1. What should students have learned by the end of this lesson?
2. How are you going to assess student understanding of the content and skills covered in this lesson? Discuss both formative and summative assessments.
3. Are there specific misconceptions that this lesson addresses? (You may wish to refer back to Sections II.B and II.C.)
4. What specific instructional strategies form the core of this lesson?

D. How the study lesson is related to the group goal

In this section you will relate your instructional choices for this lesson to the group lesson study goal. Be sure to look at your responses from the Goal Selection tool.

1. Describe how you expect the research lesson to address the group goal.
2. What features of the lesson make it well suited to addressing the group goal?

Discuss your results with a facilitator

E. Process of the study lesson

This is a chart of the planned lesson sequence. It describes what you have planned and what you expect to happen throughout the lesson. You may consult the “Guiding questions” for prompting.

Steps of the lesson: learning activities and key questions (and time allocation)	Student activities/ expected student reactions or responses	Teacher’s response to student reactions/ things to remember	Goals and method(s) of evaluation	Observation notes
<p>This column is usually laid out in order by the parts of the lesson (e.g., launch, investigation, consensus building, extension/applications, etc.), and also includes the allocation of time for each of these parts.</p> <p>This column should also include a description of key questions or activities that are intended to move the lesson from one point to another.</p>	<p>This column describes what students will be doing during the lesson, and their anticipated reactions or responses to questions/problems you will present.</p>	<p>This column describes things that you want to remember to do/ not to do within the lesson as well as other reminders to yourself.</p> <p>Also, as you have anticipated student responses and reactions (previous column), this column provides a place where you can think through how you might use those responses and reactions in synthesizing a true learning experience within your classroom.</p>	<p>This column describes the goals that are being focused upon during each part of the lesson, and for each activity/problem.</p> <p>It should also include a concrete description of how you will determine that you have achieved each of these goals.</p>	

GUIDING QUESTIONS

Steps of the lesson: learning activities and key questions (and time allocation)	Student activities/ expected student reactions or responses	Teacher's response to student reactions/ things to remember	Goals and method(s) of evaluation	Observation notes
<i>How should this lesson progress? (How much time should I spend?)</i>	<i>What do I expect of my students? How will they respond?</i>	<i>Is there anything specific I want to remember to do? Any reminders for my students?</i>	<i>What should I look for to know that my goal(s) have been achieved?</i>	
<i>How will I motivate my students?</i>			<i>How will I determine that my students are motivated?</i>	
<i>How will I use the blackboard in this lesson?</i>	<i>What do I expect my students to record in their notes?</i>		<i>Does my blackboard provide a good summary of this lesson?</i>	
<i>How will I present the activity/problem?</i>	<i>What activity will students work on?</i>	<i>What specifically will I be doing during the activity/group work?</i>	<i>What will I be looking for?</i>	
<i>Should I use group work? What size groups should I use? What rules or directions should the groups be given?</i>				
<i>What 3 or 4 processing questions will I use to move the lesson along?</i>	<i>How do I expect my students to respond?</i>	<i>What summary will I use?</i>	<i>What should they know before I continue?</i>	
<i>What new vocabulary will be introduced? How will I introduce it?</i>				
<i>What materials and/or visuals will I need? Make a list. How will I make the materials available to my students if they are intended for their use?</i>	<i>What are ways my students might use these materials?</i>		<i>What did I learn about student understanding/thinking from the use of these materials?</i>	
<i>How can I develop the lesson to alleviate or minimize them?</i>	<i>What misconceptions might students have?</i>	<i>How should I respond to each potential misconception?</i>	<i>How do I know that there are no more misconceptions?</i>	

F. Lesson implementation logistics

In this section you must commit to a particular member of the group as the teacher who will implement the research lesson.

Date:

Grade:

Period and Location:

Instructor:

Discuss your results with a facilitator

G. Evaluation

Evaluation of the effect of the research lesson on student learning is essential to the lesson study process. It provides the means for teachers to learn about and continuously improve their practice. Although the lesson will be initially taught in one particular classroom, the knowledge about learning and teaching that is gained is a product of the entire group.

*The questions below will guide you in developing a plan for evaluating the effect of your lesson on student learning. Explain what you will look for in your students' in-class behavior and work products to determine if your lesson goals were met. Be specific about what information or evidence you will collect. Remember that the evidence that you collect **must** allow you to assess the extent to which the goals were accomplished. Outline how you would like observers to assist you in collecting any of this information.*

1. How will you determine if students understood the concepts taught in this lesson?
2. How will you determine the extent that the group lesson study goal was met?
(If necessary, refer back to your Goal Selection responses).
3. What information will you collect in the course of this lesson?
4. What role will the observers play in gathering this information?

H. Appendix

Here you should attach or include copies of materials, handouts etc. that will be used during the lesson. For materials that will be used but cannot be attached (e.g., manipulatives) provide a written description and/or drawing. You should also include any materials that you have made specifically for the observers to use (e.g., observation tools or seating charts). This appendix is invaluable for observers to acquaint themselves with your lesson prior to entering your classroom. The more familiar they are with what is meant to transpire, and what you want them to focus on during their observation, the better they will be able to provide useful feedback.

