Lesson Study: Teachers and Students Learning Together

A Guide for Professional Development Providers

by Maria E. Torres
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Preface
This resource is designed for professional development providers, educational group facilitators, and other educational professionals who are interested in introducing Lesson Study as a process for improving teachers’ content knowledge and pedagogical content knowledge. While the content used here is primarily mathematics, Lesson Study is a process that can be used with any subject. No prior knowledge of Lesson Study is required to use this facilitator’s guide. The contents include a facilitator’s manual with suggested tasks for setting the stage and for viewing a video that shows the reflective component of Lesson Study that is conducted after a lesson has been observed. This video was filmed in a classroom in the southwest region.

The tasks included in this manual have been field tested with various audiences, primarily with middle school mathematics teachers. The tasks were used to provide professional development for teacher groups learning Lesson Study. Estimated total time to complete the tasks and view the video is approximately 6 hours.

Additional information for those learning and supporting Lesson Study groups is included in the references cited throughout the manual and in the appendixes.
Introduction

Lesson Study, a job-embedded professional-development strategy, has attracted growing interest in the United States since the 1995 Classroom Video Study of the Third International Mathematics and Science Study (TIMSS). In Japan, where the strategy originated and is still widely used, Lesson Study is a process where teachers work together to study curriculum. They collaboratively study content, create lessons, observe a demonstration in which a team member teaches the lesson to students, and then meet after the observation to reflect and make modifications to the lesson based on their perceptions of student understanding of the lesson. The modified lesson is then taught, followed by a second cycle of review and additional modifications. This process is repeated until the team is satisfied that students have learned the concepts intended to be taught in the lesson.

According to Catherine Lewis, Lesson Study is a “teacher-led instructional improvement cycle,” (2002, p. 2). Lesson Study holds promise for those who provide professional development. It creates an opportunity to observe transfer of instructional practices and content knowledge into classrooms. While this may not be the goal of Lesson Study as practiced in Japan, professional development providers and education professionals in the United States who support Lesson Study can use this process to examine the impact of their professional development strategies on teacher and student learning. Professional development providers can even use the Lesson Study process to improve their work through “Strategies Study,” a similar practice of lesson observation, reflection, and modification.

Education professionals who adopt Lesson Study should remember that it is long-term professional development. It is a cyclical process that essentially needs a commitment of about 3 years, with continuous monitoring, feedback, and collaboration to ensure its success. It requires on-site nurturing, leadership, and access to education professionals who can provide support in content and pedagogical content knowledge. There must be a serious commitment from those involved, not only to study lessons but to assure that lessons focus on important and challenging content and student thinking. Lesson Study requires adequate time and resources for the process to fulfill its promises.

The benefits of Lesson Study appear to lie in the shared planning of a lesson and the classroom experience in which participants engage. According to one teacher, a lesson is “a swiftly flowing river,” staying on course, yet impacting its surroundings, like “rings of water in a pond.” (Lewis & Tsuchida, 1998, p. 15) While a lesson has a focus, a course to follow, the impact of the shared lesson on participants’ levels of understanding can take many forms, depending on their levels of knowledge and skills. The reflection on that
shared experience is at the heart of Lesson Study.

In our work, training for teachers using Lesson Study was initiated by our professional development staff at the Southwest Educational Development Laboratory (SEDL), headquartered in Austin, Texas.

This resource reflects the goals for our work in the southwest region:

- We want teachers to become aware of their expectations and beliefs about students and student outcomes and how these expectations and beliefs are reflected in their instructional strategies.

- We want to improve teachers’ content knowledge, pedagogical content knowledge, assessment practices, and their capacity to match these to appropriate and effective instructional strategies.

- We want to create an environment where teachers engage in inquiry and conversations about teaching and student thinking with peers from the same grade level and across grade levels in a shared classroom experience.

- We want teachers to recognize that we need to continuously learn together about what works and what does not work for helping students learn.

What we learned during our work with teachers:

- Lesson Study can be successfully implemented.

- It is a continuous learning process, one incremental step at a time.

- It encourages thoughtfulness in the design of lessons and the selection of exemplars for instruction.

- It involves teachers.

- It focuses on students.
Setting the Stage

The first two tasks in this guide are included to help teachers identify their beliefs about students and to build an initial understanding of Lesson Study through thoughtful and active reflection. The third task engages participants in the mathematics activity that students explored during the public lesson presented on the video. This task also helps participants identify the mathematics skills that students should know and be able to do before a lesson that introduces them to the concept of direct variation. The tools in this task can be used to vertically align mathematics across grade levels, answering the question “At what grade level should students be introduced to or master this concept/skill?” In addition, participants using these tools can identify the alignment of each concept/skill with state standards.
Task 1
Identifying Implications of Personal Beliefs About Students for Lesson Design

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Participants will discover the alignment of personal beliefs about students with the types of lessons designed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials needed</td>
<td>Pen or pencil, paper, chart paper and markers, journal or carbonless copy paper (also known as NCR paper), Handout T1.1</td>
</tr>
<tr>
<td>Approximate time of task</td>
<td>30–45 minutes</td>
</tr>
</tbody>
</table>

Procedures for facilitators

1. Ask participants to think about and write responses to the questions on Handout T1.1.
2. After 5 minutes, assign participants to groups. Ask them to select a group facilitator and a group recorder. Instruct the groups to share the ideas generated individually, discuss the ideas, and record group responses on chart paper using these three headings:

   | Kind of Adults | Kind of Students | Type of Lessons |

3. After 15 minutes, conduct a whole group discussion of the question: “If the first two columns include our goals for students, how do our lessons align with these goals?” (Save the chart responses for future reference.)
4. After 15 minutes, ask participants to write their reflections about the following question, “What did this task reveal to me about the way I teach?” on carbonless copy paper. One copy is collected by the facilitator for formative assessment and the other copy is for participants.

Glossary

| Beliefs | are a state, a habit of mind, a tenet, a conviction in which trust or confidence is placed in some person, thing, or phenomenon. Synonyms include faith, credence and credit. Credit implies “assent on grounds other than proof:” |
| Values | are principles that are intrinsically desirable. |
# References


## Handouts

| T1.1       | Personal Beliefs |
Handout T1.1
Personal Beliefs

Please respond to the following questions in the space provided below each question.

1. What kind of adults do I want my students to become in our community?

2. What kind of students do I want in my classroom?

3. What kinds of lessons would reflect what I want for students as adults in our community and as students in my classroom?
### Task 2
Examining Our Definition and Perceptions About Lesson Study

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Participants will specify what they already know and what they would like to learn about Lesson Study.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials needed</td>
<td>Chart paper and markers for small groups (approximately four participants in each group), journal or carbonless copy paper, PowerPoint presentation for facilitator: “Our Approach to Lesson Study,” computer with projection device to show presentation, printout of the PowerPoint presentation as a handout (optional)</td>
</tr>
<tr>
<td>Approximate time of task</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

**Procedures for facilitators**

*It is suggested that facilitators review the information about lesson study provided in appendix A.1 before beginning this task.*

1. Draw a KWL chart on a chalkboard, chart paper, or eraser board and explain that KWL (Ogle, 1986) is an instructional tool to activate and document participants’ prior knowledge of a topic, a concept, or whatever the lesson’s focus is; what they want to learn; and, once, the lesson has ended, what they learned.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What We Know</td>
<td>What We Want to Know</td>
<td>What We Learned</td>
</tr>
</tbody>
</table>

2. Ask for volunteers to share definitions and whatever they know about Lesson Study. Record their responses in the K (Know) column of the chart.

3. Talk about the differences and the commonalities of the responses. Be aware that some of the discussion may begin to include reasons why Lesson Study will not work in the United States. The point here is not how Lesson Study works in Japan, but how Lesson Study could be implemented in the United States.

4. Ask participants what questions they have or what they want to know about Lesson Study. Record their responses in the W (What We Want to Know) column of the chart. Possible answers include: Who takes care of the other classes when their teachers are observing the lesson? What if the students get nervous about being observed? How long is a lesson? Who decides who will teach the lesson? and What if the class has a history of misbehaving?
5. Weave participants’ prior knowledge of Lesson Study into the PowerPoint presentation, “Our Approach to Lesson Study.”

6. At the conclusion of the presentation, use the KWL chart and go over the “What We Want to Know” list generated in step 4 and note those that have been discussed in step 5. Tell participants that as they continue through this session, they will learn more about Lesson Study. They will complete the L (What We Learned) part of the chart after completing Part 3 of Viewing the Process.

7. Ask participants to write their reflections about the following question, “What support would I need if I were to start Lesson Study at my school?” on carbonless copy paper. One copy is collected by the facilitator for formative assessment and the other copy is for participants.

Glossary

**KWL**, created by Donna Ogle (1986), is a 3-column chart that helps capture the before, during, and after components of reading a text selection.

**K** stands for **Know** (What do I already know about this topic?)

**W** stands for **Will** or **Want** (What do I think I will learn about this topic? What do I want to know about this topic?)

**L** stands for **Learned** (What have I learned about this topic?)

References


Task 3
Working Out the Mathematics: The Lesson

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Participants will become familiar with the concept of direct variation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials needed</td>
<td>A copy of your state mathematics standards, paper, pencils, graph paper, copies of Handouts T3.1a, T3.1b, T3.1c, T3.2, T3.3</td>
</tr>
<tr>
<td>Approximate time of task</td>
<td>60–90 minutes</td>
</tr>
</tbody>
</table>

Procedures for facilitators

1. Inform the group:
   Teachers in the video developed lessons that focused on teaching students to develop proportional thinking. Proportional thinking was one of the weakest areas of mathematical understanding among eighth graders in the United States according to the results of Third International Mathematics and Science Study (TIMSS, 1995).

   Teachers in the video studied the mathematics content areas before they developed their lesson. The teachers who developed the lesson on direct variation used many resources, but the primary source for this lesson was Susan J. Lamon’s (1999) *Teaching Fractions and Ratios for Understanding: Essential Content Knowledge and Instructional Strategies for Teachers*.

2. Distribute the handouts on direct variation, The Agra Problem, (Handouts T3.1a, T3.1b, and T3.1c). Ask participants to choose and work one of the problems. Allow 15 to 20 minutes for this problem solving. The problems require similar knowledge and skills, but their contexts are different.

3. Ask participants to list what students need to know and be able to do to complete the problem they selected. Allow 10 to 15 minutes for this process. Then ask participants to share their solutions and their questions about the task, if any, with the whole group. Record their ideas about what students need to know and be able to do on a chart like the one shown below.

| Direct Variation |
|------------------|------------------|
| Knowledge        | Skills           |
Lesson Study: Teachers and Students Learning Together

4. Tell participants that teachers who developed this lesson also had to organize the knowledge and skills that students needed to have in a graphic organizer called a knowledge package (Handout T3.2). Distribute copies of Handout T3.2 and review the instructions.

5. Ask participants to work in small groups to complete a Knowledge Package on chart paper using the information from the chart they created in step 3. Allow 15 to 20 minutes for this activity. Ask groups to review each other’s charts. Charts can be posted and the group can do a gallery walk (see the glossary) and take notes on ideas they want to add to their charts or questions they have about a chart. If charts cannot be posted, groups can go from table to table to review the charts. They can then modify information on their own charts, if necessary. Charts do not have to be the same at this time; the goal is to increase the awareness of the mathematical concepts participants will see students learning in the video.

6. Once participants have reviewed the charts, distribute Handout T3.3 to groups so they can determine at what grade level students should have been introduced to or should have mastered the concept/skill. Ask each group what they have learned about vertical alignment (defined in the glossary). Allow 15 to 20 minutes for this activity.

7. Ask participants to write their responses to the following question, “What did I learn about direct variation?” on carbonless copy paper. One copy is collected by the facilitator for formative assessment and the other copy is for participants’ portfolios.
<table>
<thead>
<tr>
<th><strong>Glossary:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong> is cognition of something gained through experience or association.</td>
</tr>
<tr>
<td><strong>Skill</strong> is the ability to use one’s knowledge effectively and readily in execution or performance.</td>
</tr>
<tr>
<td><strong>Ratio</strong> is the relationship between two quantities.</td>
</tr>
<tr>
<td><strong>Proportion</strong> expresses the equivalency of two ratios.</td>
</tr>
<tr>
<td><strong>Direct Variation</strong> is used to describe the proportionality of two quantities, sometimes referred to as “variables.” When one of the quantities changes, the other changes, maintaining the same relationship. Therefore the change is in “direct variation.”</td>
</tr>
<tr>
<td><strong>Knowledge Package</strong> is a graphic organizer used by Liping Ma (1999) to describe and illustrate the connectivity between mathematical concepts and skills that leads to the understanding of the next mathematical idea. Chinese teachers, according to her research, “pack” their mathematical knowledge in this manner.</td>
</tr>
<tr>
<td><strong>Gallery Walk</strong> is a review of posted work, usually in silence. After a task involving chart making, charts are posted on the walls or can be placed on desks. Participants then tour the “gallery” of work. Viewing questions (prompts) that focus on the content on the charts are provided to participants.</td>
</tr>
<tr>
<td><strong>Alignment</strong> (also referred to as vertical alignment or vertical articulation) is the process of identifying what is taking place in the curriculum before and after each grade level or before or after a course that is in a sequence of courses. For students and teachers, vertical alignment provides for easy transition from one grade level to another and reduces unnecessary repetition of content area. It helps schools to identify gaps in the curriculum in place to meet mandated standards and benchmarks.</td>
</tr>
</tbody>
</table>
References


Handouts

- **T3.1a** Working with Proportions
- **T3.1b** Direct Variation Student Record Sheet, Problem 1
- **T3.1c** Direct Variation Student Record Sheet, Problem 2
- **T3.2** A Knowledge Package
- **T3.3** Alignment
Handout T3.1a  
Working with Proportions

Student Name:  
Date:  
Class Period:  

A ratio is a comparison of two numbers. A ratio may be represented in any of these ways:  

\[ \frac{a}{b} \quad \text{a to b} \quad a/b \]

A proportion is an equation that shows that two ratios are equivalent. A proportion may look something like this:  

\[ \frac{a}{b} = \frac{c}{d} \]

You will be working on one of two proportion problems with your group.  

After you complete your work with one of the problems, return to this page to answer this question: What are three things that you notice about your solution? 

1. 

2. 

3.
Handout T3.1b
Direct Variation Student Record Sheet, Problem 1

Student Names:

Date:

Class Period:

Group A: If David goes to the video arcade and purchases 8 tokens with which he is able to play 12 video games, how many games could Jenny play if she purchased 12 tokens? Use a graph to solve this problem. Consider using six points to plot on your graph.

<table>
<thead>
<tr>
<th>Video Games</th>
<th>Tokens</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Handout T3.1c
Direct Variation Student Record Sheet, Problem 2

Student Names:

Date:

Class Period:

Group B: Agra High School is hosting a basketball camp this summer. Eight teams will need six racks of basketballs to practice. Coach Brown increased the camp size to include 20 teams. How many racks of basketballs will be needed? Use a graph to solve this problem. Consider using six points to plot on your graph.

<table>
<thead>
<tr>
<th>Racks</th>
<th>Teams</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
Handout T3.2
A Knowledge Package

Background Information

Liping Ma, (1999) in Knowing and Teaching Mathematics, uses the term knowledge package to describe and illustrate the connectivity between mathematical concepts and skills that lead to the understanding of the next mathematical idea. Chinese teachers, according to her research, “pack” their mathematical knowledge in this manner.

Completing a Knowledge Package

For our purposes, we will use a knowledge package to think of the mathematics involved in solving a problem to answer the question “What are the prerequisite knowledge and skills that students need to have to develop conceptual understanding of Direct Variation?”

Step 1

Think of the necessary mathematics concepts/skills that are needed to master the mathematical task identified, then do the following:

Decide on the one concept/skill that is the most crucial for student mastery of Direct Variation and place that concept/skill in the rectangular shape that lies just below the new learning ellipse (the one labeled “Direct Variation”).

If there are one or two other concepts/skills that are deemed especially critical, place those in the other shaded ellipses.

Step 2

Place other essential concepts in the unshaded ellipses. (It is not necessary to fill in every ellipse.)

Step 3

Place arrows between ellipses to indicate how your identified concepts build on each other. Which concepts /skills are necessary before one can learn another of the concepts/skills? What is the prerequisite concept/skill that one has to know and be able to do before the other?
A Knowledge Package About the Concept of Direct Variation

New Learning: Direct Variation
**Handout T3.3**

Alignment

At what grade level are students introduced to or expected to master this concept/skill?

This is a suggested table. List the entries in your knowledge package in the first column. Identify the standard by name and number (based on your state standards) for all your entries under the grade levels.

<table>
<thead>
<tr>
<th>Knowledge/Skill</th>
<th>6th Grade</th>
<th>7th Grade</th>
<th>8th Grade</th>
<th>9th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Function</td>
<td>State Standard 6.1a</td>
<td>State Standard 7.1a</td>
<td>State Standard 8.1a</td>
<td>State Standard Alg. 1.9.1a</td>
</tr>
</tbody>
</table>
Viewing the Process

This activity contains three parts. First, participants view a segment of the video Lesson Study: Teachers and Students Learning Together. They are asked to observe the roles of participants in the Lesson Study process and to reflect on the tasks that need to be completed prior to and during a Research Lesson Colloquium. In the second phase of the activity, participants watch another segment of the video. They again take notes and discuss what they observed, including the manner in which feedback is provided to teachers during the reflection session. Finally, participants view a third section of the video. In this activity, they are asked to take note regarding what they believe participants in the Research Lesson Colloquium learned about mathematics, student thinking, learning in general, teaching in general, assessment, and resources.
Viewing the Process
Part 1 What Are the Roles of Participants in Lesson Study?

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Participants will recognize the responsibilities of each educator involved in a Research Lesson Colloquium.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials needed</td>
<td>Part 1 of the video <em>Teachers and Students Learning Together</em>, chart paper and markers for teams, carbonless copy paper, Handout VP1.1</td>
</tr>
<tr>
<td>Approximate time of task</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

Procedures for facilitators

1. Tell participants that they will be viewing the first part of a video about a Lesson Study reflection session. In this part, there are scenes of the community, two members of the writing team meeting together to finalize the lesson, some of the observational tasks, some of the reflection, and the personal reflection time that takes place after the classroom experience.

   Note to Facilitator: As noted in the PowerPoint presentation, “Our Approach to Lesson Study,” the summer training experience was not filmed. This video focuses on the events of and participants’ roles in the Research Lesson Colloquium (the public demonstration lesson).

2. Then say, “As you view part 1 of the video, observe what people are saying and doing during the lesson. Take notes in response to the Handout VP1.1.”

3. Show part 1 of the video.

4. Ask participants to discuss their observations with a partner. Allow about 3 minutes for this discussion.
5. After 3 minutes, ask for volunteers to share some of the key ideas discussed. Then lead a brainstorming session with the following questions:

Given that the teachers planned the lesson, tried the lesson, and had a sense of what was going to happen:

What preparation was necessary to ensure observers were informed and ready to observe the lesson?

What preparation, if any, was necessary to ensure students understood their role in Lesson Study?

Who else may need to have information/preparation for a Research Lesson Colloquium?

6. Write their responses on chart paper. Save them for development of actions plans later in the session.

7. Ask participants to write their reflections using the following prompt, “If I tried Lesson Study in my school, I would make sure…” on carbonless copy paper. One copy is collected by the facilitator for formative assessment and the other copy is for participants.

Glossary

**Research Lesson Colloquium** is the day or time of the meeting where the implemented lesson is observed followed by the debriefing component of Lesson Study. The lesson is observed by teachers and other professionals who are in actuality “researching the lesson.”

**Public Lesson** is the lesson that is observed publicly during a Research Lesson Colloquium.

Handouts

**VP1.1** Participant Roles
Handout VP1.1
Participant Roles

1. What are students doing?

2. What are teachers doing?

3. What are other educators doing?
Viewing the Process
Part 2 Why is How I Say Something as Important as What I Say?

<table>
<thead>
<tr>
<th>Purpose:</th>
<th>Participants will identify the underlying premise of the Lesson Study professional development model.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate time of task:</td>
<td>25 minutes</td>
</tr>
</tbody>
</table>

Procedures for facilitators

1. Ask participants to think about the following question for 2 minutes, and then ask for responses: “If someone were to observe you teaching a lesson, what type of feedback would you want?”

2. Record participants’ responses on chart paper and encourage group members to discuss their ideas.

3. Ask participants if they see similarities and/or differences in their responses. Most responses will most likely fall under the heading “what the teacher is doing.”

4. Then say, “As you view part 2 of the video, observe what people are saying and how they are saying it. Take notes regarding the questions on Handout VP2.1”

5. Show part 2 of the video.

6. Lead a discussion of what the participants observed. Ask them to review their responses from the beginning of this task. Compare what they are saying to what they said before. If needed, note that according to Catherine Lewis (2002), debriefings focused on student thinking as opposed to those that highlight student behavior may support increased understanding of how students think. Emphasize that the focus of the discussion after a demonstration lesson should be on the lesson and student engagement. The debriefing is not a discussion about what the teacher should or should not do during the lesson.
7. Ask participants to use the following prompt to identify strategies that should be used to focus on student thinking. “In order to focus on student thinking, Lesson Study observers would need ....” on carbonless copy paper. One copy is collected by the facilitator for formative assessment and the other copy is for participants.

References


Handouts

VP2.1 Observations/Notes
Handout VP2.1
Observations/Notes

1. What is being said?

2. What should be said?

3. How is it being said?

4. How should it be said?
Viewing the Process
Part 3 What are the Participants Learning?

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Participants will identify what is being learned based on information they gather while viewing this third segment of the video.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials needed</td>
<td>Part 3 of the video, carbonless copy paper, Handout VP3.1</td>
</tr>
<tr>
<td>Approximate time of task</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

Procedures for facilitators

1. Ask participants to choose one or two of the topics on Handout VP3.1 and to take notes about their topic while watching the video. Make sure that at least one participant chooses each topic.

2. Show Part 3 of the video.

3. After viewing part 3, group participants (as best as you can) by the topic they chose. Tell them to discuss what they observed among themselves and to be ready to report on their collaborative observations. Allow 10 to 15 minutes for discussion.

4. Ask for volunteers to share their reports.

5. Remind participants about a lesson being “a swiftly flowing river,” staying true to its course, but providing opportunities for students to grow as inquirers and problem solvers in a variety of ways and contexts.

6. Bring attention to the posted KWL chart from Task 2. Complete the L part of the chart (What We Learned) by asking participants to describe what they have learned.

7. For formative assessment, ask participant to answer the following questions on carbonless copy paper: What did educators in this video learn about mathematics, student thinking, learning, teaching, assessment, or the use of resources? Would educators have learned about this topic without participating in Lesson Study? What value, if any, is there in the Lesson Study process?

One copy is collected by the facilitator for summative assessment and the other copy is for participants.
<table>
<thead>
<tr>
<th>Handouts</th>
<th>VP3.1</th>
<th>Observations/Notes</th>
</tr>
</thead>
</table>

Handout VP3.1
Observations/Notes

What are participants learning about each of the following and how can you tell?

1. Mathematics

2. Student thinking

3. Learning

4. Teaching

5. Assessment

6. Resources
Concluding Activity

In this activity, participants reflect on what they have learned about Lesson Study and design a plan of action for implementing Lesson Study in their school or district.
Concluding Activity
The Deeper Meaning of Lesson Study

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Participants will be provided a process for setting goals to use Lesson Study.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials needed</td>
<td>Chart paper, markers, Handout CA.1: Planning the SMART Way, and Handout CA2: Action Plan Template</td>
</tr>
<tr>
<td>Approximate time of task</td>
<td>45 minutes</td>
</tr>
</tbody>
</table>

Procedures for facilitators

1. Tell participants that by this time they should be familiar with what Lesson Study may look like in one or more schools but that implementing Lesson Study is not the final goal. Lesson Study enables the people to reach the bigger, overarching goals for student learning. Lead a brainstorming session, answering this question, “What do my students need to know and be able to do to be successful in school?”

2. Distribute and review Handout CA1, Planning the SMART Way and Handout CA2, Action Plan Template.

3. Ask participants to form teams of three and choose any of the ideas generated under step 1. Using this outcome for students, participants should develop goals and a plan that would lead to the selected outcome using Lesson Study. Remind them to refer back to their reflections from part 1, Viewing the Process that are on chart paper and to include preparation steps in their plans. Develop a SMART plan. Answer any questions.

4. Remind participants that Lesson Study is long-term professional development. It is cyclical. That while their plans may include immediate goals, they need to keep in mind a 3-year plan.

5. After 30 minutes, have participants share their drafts.

6. Thank participants for their attention, collaboration, and participation. Distribute and ask them to complete the summative assessment.
7. Summative Assessment: Ask participants to complete this metaphor on carbonless copy paper. Ask them to give at least three reasons.

Lesson Study is like ______________ because _______________________; because ___________________; and because ___________________.

One copy is collected by the facilitator for summative assessment and the other copy is for participants’ portfolios.

References

Handouts
CA1 Planning the SMART Way
CA2 Action Plan Template
Handout CA1
Planning the SMART Way

SMART is an acronym that stands for:

**Specificity.** In our plans, goals should be specific. We may have a vision or a mission about what is to be done, but in planning, goals need to be specific.

**Measurability.** Goals should be measurable, quantitatively and qualitatively. Having measurable goals keeps the plan on track.

**Attainability.** Goals should be attainable. They can be challenging, but they also have to be realistic. Whatever the steps in a plan, each one assures the attainability of the goal.

**Responsibility** (sometimes this R stands for Relevant). Certain people need to be designated to attain the goal. Along with this Responsibility, we also include Resources needed to carry out the steps of the plan.

**Time Bound.** Goals should have timelines that include date that the plan will begin with benchmarks along the way and proposed date of completion.

Adapted from Holberton, (2003).
Handout CA2
Action Plan Template

Objective:

How Measured:

<table>
<thead>
<tr>
<th>Action Steps to Attain Objective</th>
<th>Responsible Person(s)</th>
<th>Resources Required</th>
<th>Timeline</th>
</tr>
</thead>
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</tbody>
</table>
**Additional References**


Lesson Study URLs

http://www.lessonresearch.net
http://www.nwrel.org
http://www.rbs.org
http://www.sedl.org
http://www.tc.edu/

E-mail lists:
lessonstudy@listserv.tc.columbia.edu
Appendix A

A.1 Background Information for Facilitator
(For Use with the PowerPoint Presentation “Our Approach to Lesson Study”)

Introduction

Lesson Study, a job-embedded professional development strategy, has gained interest in the United States since the 1995 Classroom Video Study of the Third International Mathematics and Science Study (TIMSS). In Japan, where it originated and is widely used, Lesson Study is a process where teachers work together to study their curriculum. They create lessons, collaboratively observe a lesson as a member of the team teaches in a demonstration with students, and then meet after the observation to reflect and make modifications to the lesson depending on how they perceive it helped students understand the concept of the lesson. The modified lesson is then taught, followed by a second cycle of review and modifications. This process is repeated until the team is satisfied that students learned the concepts intended to be taught by the lesson.

Lesson Study holds promise for those who provide professional development. It creates an opportunity to observe the transfer of instructional practices and content knowledge into classrooms. While that may not be the goal of Lesson Study as practiced in Japan, professional development providers and knowledgeable others in the United States who support Lesson Study can use this process to examine the impact of their professional development strategies on teacher and student learning. Professional development providers could apply the process of Lesson Study to their work, conducting something that may be called a “Strategies Study.”

The benefits of Lesson Study appear to lie in the shared planning of a lesson and classroom experience in which participants engage. A lesson, according to one teacher, is “a swiftly flowing river,” staying on course, yet impacting its surroundings, like “rings of water in a pond,” (Lewis, 1998, p. 15). While a lesson has a focus, a course to follow, the impact of the shared lesson on participants’ levels of understanding can take many forms depending on their prior knowledge and skills. The reflection of that shared experience is at the heart of Lesson Study.

Our Approach to Lesson Study

Initiating Lesson Study
Our Approach to Lesson Study begins with a summer institute where participants receive professional development in mathematics content, pedagogical content, student
assessment, and Lesson Study. At the institute, teachers identify unifying concepts of a mathematical topic, research the concepts, and share their findings. They form writing teams and develop lessons around those unifying concepts. A tentative schedule is planned for the writing teams to meet again, field-test their lessons before a public demonstration, meet to discuss the results of the field tests, modify the lesson, and select possible dates for the public demonstration lessons (also called Research Lesson Colloquiums). Writing teams can be from the same schools, different schools, different school districts, or even different cities or towns.

Preparing for the Research Lesson Colloquiums
Participants go back to their schools, field-test, and refine their lessons. The professional development provider and participants maintain contact electronically, using e-mail lists, or individual e-mail. The teacher who agreed to demonstrate the lesson secures permission to record from students’ parents prior to the Research Lesson Colloquium session. If the Research Lesson Colloquium is conducted in another setting to accommodate observers, the teacher holds class in that setting prior to the Research Lesson Colloquium to ensure students are acquainted with the new environment. Meanwhile, the professional development provider invites a commentator to give an external perspective on the lesson and its implementation. The invited commentator may be a curriculum supervisor, a higher education professor, or any other educator involved in professional development. (See Appendix A.6 for the commentator’s form.)

Observing the Public Lesson:
The Day of the Research Lesson Colloquium

Step 1: The Orientation
The day of the Research Lesson Colloquium begins with an orientation meeting to discuss changes to the lesson, if any; provide the observers with a general idea of what is expected from the lesson; and assign different tasks to observers (explained below). In addition to a copy of the lesson, observers are provided with an observation protocol (Appendix A.2).

The facilitator reviews a seating chart of the class to assign observational tasks. Some observers choose a single student to observe, some observe the general impact of the lesson on the entire class, and some observe small groups of students. The intent is to assess the impact of the lesson on student engagement with the content and to listen for ways in which students are thinking about the mathematics.

Observers are instructed to follow classroom courtesy rules such as (1) do not help students, (2) do not interfere with the lesson, and (3) do not converse with each other.
**Step 2: Observing the Lesson**
Observers are in the classroom for the observational task before the students arrive. The teacher begins the lesson and does not acknowledge observers. Demonstration lessons that are observed usually run 50–60 minutes. During the lesson, observers take notes about what they see happening on the observation protocol form.

**Step 3: Personal Reflection**
After the lesson is over, observers have to reflect on what they saw. Each participant summarizes notes and observations about what was learned or observed and the evidence that supports his or her observations. The summary is used for the whole group discussion.

**Step 4: Group Discussion**
In this whole group discussion, each person shares summaries and makes recommendations about the lesson. The facilitator for this meeting is the professional development provider. Time for comments is limited to 5 minutes per person. The demonstration teacher begins the discussion, followed by the writing team, and then the rest of the group. Finally, the invited commentator makes closing remarks and a time is set for the writing team to meet to refine the lesson based on the reports of the observers and their own reflection. Before closing the discussion, each member of the group writes a note to a student or students in the classroom observed, thanking the student for his or her cooperation and work.

**Step 5: Feedback to Students**
The demonstration teacher may choose to survey students about the lesson and the observation. The demonstration teacher also shares the notes written by the observers to the students.

**Step 6: Writing Team Meeting**
The writing team meets to rewrite the lesson on the date and time they set. This does not necessarily occur on the same day as the public demonstration lesson. The team writes a report of what they learned about teaching and learning and about mathematical concepts. They also document how the lesson was changed based on evidence provided by the observers and the recording of the lesson, if available.

**Step 7: Possible Second Iteration of the Lesson**
Another teacher on the team or one of the observers may want to implement the modified lesson and share his or her insights about the revised lesson with the rest of the group. If the team chooses, the revised lesson can become the focus of the process which is then repeated.
Appendix A.2
The Observation Protocol

Date _________________ Observer __________________________

Role/Assignment ________________________

Site __________ Grade Level __________ Number of Students _________

Background Information (provided by writing team prior to the actual observation)

What kind of people do we want our students to be?

What kind of mathematicians do we want our students to be?

Title of the Lesson:

Key Concepts:

Standards Addressed:
What national and/or state standards is the lesson addressing?

Prior Knowledge:
What do students currently understand about this topic?

Connection to Previous and Future Topic/Lesson:
What other mathematical connections will you embed in your lesson?
<table>
<thead>
<tr>
<th>Pre-Observation</th>
<th>Take notes below.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Lesson Sequence of Events</th>
<th>Take notes below.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>What will the teacher be doing?</th>
<th>Examine teacher engagement and type of teacher talk and questions.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>What will be the student be doing?</th>
<th>a. Possible reactions/responses  b. Study how students are collaborating  c. Document the variety of solutions, including student errors</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Evidence</th>
<th>a. Questions asked  b. Written or posted work  c. Student engagement  d. Other</th>
</tr>
</thead>
</table>
Appendix A.3
The Writing Team Role after the Research Lesson Colloquium

The Writing Team:

1. Reviews
   - Notes
   - Videos, if any
   - Student surveys/work
   - Other

2. Refines the lesson based on feedback.

3. Writes a summary of what they as a team have learned about the following areas:
   - Mathematics
   - Teaching
   - Student thinking
   - Assessment
   - The use of resources
   - Shifts expected in systemic reform
   - Includes a proposed schedule for the reteaching of the modified lesson.

4. Turns in their modified lesson and report to the contact person.
Appendix A.4
Report of the Invited Commentator

Observation:
Date:
Location:
Grade Level:
Number of Students:

Title of Lesson:

Lesson Objectives:

1. Comment on the lesson, providing an external perspective on the lesson and its implementation.

2. Address and provide evidence of how the lesson does or does not connect to local, state, and national standards and the needs of students that are historically underserved and underrepresented.

3. Comment on how this model of professional development benefits all participants, not just the writing team.
   a. What was learned about mathematics?
   b. What was learned about student thinking?
   c. What was learned about teaching?
   d. What was learned about the use of resources/materials?
   e. What was learned about assessment?
   f. What was learned about the shifts expected from systemic reform?

4. Suggest considerations for future work.
Appendix B
The appendixes in this section can be used as handouts distributed prior to watching the video or as information for the facilitator.

Appendix B.1
Events Leading to the Agra Experience

Overview

This video is a record of a public lesson that was held in April 2003, in Agra, Oklahoma, a small community east of Oklahoma City. The demonstration lesson was part of the follow-up activities to a SEDL Summer Institute, held in Tulsa, Oklahoma. Participants were notified that video recording would occur, but there were no “rehearsals” for this event. What is captured here is what actually happened on that day.

The Participants

Sherry Cagle, the volunteer teacher, and the teacher observers were participants in the Summer Institute for middle school mathematics teachers who represented different regions of the state. One of the teacher observers is an Agra mathematics teacher who was invited to participate. In addition to the facilitator, there were five other observers: two university professors, a district specialist, one mathematics director from a statewide organization in Oklahoma, and a regional consortia mathematics specialist. The reason for the inclusion of observers other than the teacher participants was to provide these representatives the opportunity to participate in a Lesson Study event. This was the first Lesson Study experience for them. The teacher participants, however, had already experienced a Lesson Study demonstration lesson in Fall 2002 in Tulsa, Oklahoma. Observers used an observation protocol modified from Lewis’s (2002) work with Lesson Study. The students were eighth graders from Ms. Cagle’s third period mathematics classes. They had been told of the videorecording session and parent permission was obtained for participation in videotaping each student in the class. (See Appendix B.2, which has samples of Parent Permission forms.)

Initial Training: Proportionality

During the 2003 Summer Institute, participants worked on mathematical tasks focused on proportional reasoning. Proportionality was one of the areas identified by the Third International Mathematics and Science Study (1995) that was in need of attention in the United States.
Participants were to identify the conceptual ideas that were inherent in the tasks they were asked to complete. They were to identify the knowledge and skills students would need to have in order to be successful with the tasks. Participants then generated a list of the concepts. From this list, main ideas were identified and studied by teams of teachers representing grades 5 through 9. Teams explored their own knowledge about a chosen topic, used the Internet, visited a professional library, and searched through other resources such as videos, journals, textbooks, and other publications. The topics they studied included absolute versus relative thinking, change, and the concepts of ratio, scale, and direct variation. Teams then shared what they had learned about the mathematics. They learned that ratios could be added without finding common denominators; that slope was a ratio, and that equivalent fractions represented the same relationship between two quantities. They also learned that a proportional relationship was a linear function and when graphed on a coordinate plane was represented by a line passing through (0, 0). This relationship is called direct variation.

Other Topics at the Summer Institute

Facilitators at the summer institute modeled instruction using open-ended tasks, encouragement of student solutions, and alternative assessment practices. Participants were introduced to three publications and one video relevant to Lesson Study and mathematics. They are listed below.


Appendix B.2
A Sample Parental Permission Form in English

STUDENT RELEASE FORM
(to be completed either by the parents or legal guardians of minor students involved in this project)

Dear Parent/Guardian:

I am a participant this school year in a project directed by the Southwest Educational Development Laboratory. My participation in this project is voluntary. One of the primary purposes of this project is to enhance student learning in mathematics and encourage excellence in teaching.

This project requires that short video recordings of lessons taught in your child’s class be submitted. Although the video recordings involve both the teacher and various students, the primary focus is on the teacher’s lesson, not on the students in the class. In the course of taping, your child may appear on the video recordings. Also, at times during the year, I may be asked to submit samples of student work for analysis of the lesson, and that work may include some of your child’s work.

No student’s last name will appear on any materials that are submitted. All materials will be kept confidential. The form below will be used to document your permission for these activities.

Sincerely, _________________________________ Date ____________________________
(Teacher Signature)

PERMISSION SLIP

Student Name: _______________________School/Teacher: ___________________________

Your Address: _________________________________________________________________

I am the parent/legal guardian of the child named above. I have received and read your letter regarding the mathematics improvement/excellence in teaching project being conducted by the __________________________________ and agree to the following:

(Please check the appropriate box below.)

☐ I DO give permission to you to include my child’s image on video-recording as he or she participates in a class conducted at ______________________________ (School) by ______________________________ (Teacher’s Name) and/or to reproduce materials that my child may produce as part of classroom activities. No last names will appear on any materials submitted by the teacher.

☐ I DO NOT give permission to videotape my child or to reproduce materials that my child may produce as part of classroom activities.

Signature of Parent or Guardian: ______________________________Date: __________________
Appendix B.3
A Sample Parental Permission Form in Spanish

PERMISO DE AUTORIZACION
(para los padres o encargados de los estudiantes participantes)

Estimado padre o madre de familia, encargado o tutor legal:

Este año soy uno de los participantes en un proyecto del_______________________________. Uno de los propósitos principales del proyecto es mejorar el aprendizaje de los alumnos y fomentar la excelencia en la enseñanza.

Este proyecto requiere que yo exhiba videos de las lecciones que doy en el grupo de su hijo(a). Aunque en los videos aparecen el maestro y sus estudiantes, la atención se centra en la lección del maestro, no en los estudiantes. Al videograbar mi clase, su hijo(a) podría aparecer en el video. También se le pide al maestro que exhiba muestras del trabajo de sus estudiantes en varias como evidencia de la lección. El trabajo de su hijo(a) podría ser incluido en esas muestras.

Los apellidos de los estudiantes no aparecerán en los materiales que se exhiban. Todos los materiales serán tratados de manera confidencial. El formulario que aparece abajo será utilizado como prueba de su autorización para que su hijo(a) pueda ser incluido(a) en estas actividades.

Atentamente, ___________________________________ Fecha __________________________
Firma del (de la) maestro(a)

==========================================================================

AUTORIZACION

Nombre del (de la) Estudiante: ____________________________________________________
Domicilio: _____________________________________________________________________
Escuela ________________________ Maestro/a______________________________________

Yo, padre, madre, encargado o tutor legal del (de la) estudiante que se menciona arriba. He recibido y leído su carta sobre el proyecto que lleva a cabo el__________________________, y expreso lo siguiente:

(Por favor marque abajo en el cuadro correspondiente)

☐ DOY mi autorización para que la imagen de mi hijo(a) aparezca en el video al participar en la clase impartida en por y para que se haga copia de los materiales que el (ella) pueda llegar a producir como parte de sus actividades en el salon de clases. Los apellidos de los estudiantes no aparecerán en los materiales que el maestro exhiba.

☐ NO DOY mi autorización para videograbar a mi hijo(a) ni para que se haga copia de los materiales que el (ella) llegue a producir como parte de sus actividades en el salon de clases.

Firma del padre o madre, encargado o tutor:

_________________________________________ Fecha: _________________________
Appendix B.4
The Agra Observation Day Agenda (April 24, 2003)

Facilitator: Maria E. Torres
Teacher: Sherry Cagle
Other Writing Team Members: April Andreatta Lingle and Roslynn Rayford
Meet in the Agra Public Schools Gym (the old one)
(Please sit in bleacher designated area.)

8:30–9:10  Pre-Observation

Welcome

Focus of/changes to the lesson by teacher
Consider the following: What is the work in which students were previously engaged that leads to this lesson? What is the goal of the lesson? What will the teacher be doing in terms of the lesson? What are the questions that will be asked to engage students in the lesson? What will the students be doing to fulfill the goals of the lesson? What resources will be used? What evidence will be collected?

Orientation for observers
Be familiar with the observation protocol (No scoring!).
Assuming responsibility for data gathering: Select either group A or group B or randomly select a student.
Arrive at consensus about observers’ behavior during the observation.
Smiles are permitted.
Discussion among the observers is not permitted.
Please do not interfere with the flow of the lesson.
Do not help students.
Observe the rules of courtesy.

9:10–9:15  Transition
Move furniture to the stage side of the gym. Move to upper bleachers. Students will be arriving and sitting in bleacher area as well.

9:15–10:30  Observation
The teacher does not acknowledge observers. The teacher begins and implements the lesson. Observers/researchers will follow their assigned group. Invited commentators/guests are free to monitor groups or stay in the bleacher area.
10:30–11:00 Close-up
This part of today’s event is not part of the process. This is to accommodate the professional videotaping of this lesson. Please cooperate with the camera crew.

11:00–11:30 Individual Reflection
Select a place in the gym where you can analyze the data generated through the observation. Reflect and organize your thoughts. Base your comments on your individual record of observation with concrete and specific evidence, considering the intent of the lesson versus the actual events. Comments on teaching style should be made only in the context of the lesson plan and the actual events. Use carbonless copy paper: one copy is for the writing team and one copy for you. Organize your thoughts and comments into a five minute summary. Please stay within the time limit.

11:30–12:15 Lunch (Courtesy of Agra Public Schools)
Lunch will be served in the snack area of the new gym.

12:30–2:30 Group Discussion
Regroup in Sherry Cagle’s classroom.
Assign a recorder from the members of the writing team.
The teacher leads the discussion, then writing team members report.
Other observers /researchers report. (5 minutes each)
The invited commentator responds. (10 minutes)
The recorder provides a summary of what was said. (10 minutes)

2:30–3:00 Future Planning
Ideas for the summer
Paperwork: Summer Registration, invoice, W9 forms, Permission 2003–04 SCIMAST support for schools

3:00–3:30 Closure and Evaluation
Post-it messages to class
Writing team report format and date of next meeting: ___________
Next Group Meeting June 23–27 in Tulsa
Evaluation: carbonless copy paper–turn in to facilitator.

Thank you so much!