

## Set Goals

In the initial goal-setting phase of lesson study, teacher participants begin by setting a goal for their students that they are aiming to address in the research lesson. This is often something that is difficult for the students to learn, or difficult for the teachers to teach (or both). Teachers work collaboratively to set goals, asking one another questions to hone in on the lesson goals. Further, teachers discuss the challenges they face in supporting deep student understanding of key mathematical ideas (such as proportional reasoning and understanding linear systems). At times, the learning goal is based on a testing of theories presented by other researchers and/or teachers – including seeing what students are capable of, given positive learning conditions. Often, "the desire to improve is stimulated by seeing what's not working" (Lewis et al., 2006). Goal setting leads to an exploration for the best instructional strategies that could be used to achieve the goal (Fernandez, 2002).

The following clip is taken from the initial meeting of a group of lesson study teachers, administrators and researchers engaged in a two-year lesson study project (in four school teams). After reflecting upon the previous year of lesson study, individual schools broke off into their respective teams to brainstorm what their lesson study goal might look like. One member of the team summarizes the key issue that teachers identified during their initial discussions.

## Between Stages 1 & 2

Participating mathematics teachers in our study identified five main activities between stage 1 (goal setting) and stage 2 (planning) of the lesson study cycle. These are:

1. Searching - researching the internet, data-bases and teacher resources about the topic in focus;
2. Conceptualizing - brainstorming, self talk and informal conversations, exploring valuable tangents;
3. Investigating – exploring the use of manipulatives and technological tools with students to expand the teachers' and students' repertoire;
4. Exploring - deepening understanding of the mathematics concepts through exploration; and,
5. Monitoring - keeping up with details such as on-going student assessment which provides insights into student learning and assists in the planning of lessons.

The teachers explained that this stage of “playing” and “figuring out” was deeply connected to their understanding of math concepts and how those concepts could be represented and investigated by students.

This video clip is taken from a planning session of one school team, where teachers were working through their understanding of how to represent growing linear patterns geometrically, and then using these geometric representations to reveal the linear function (rule) of the pattern. As one teacher later said, the value of this planning session for her lay not so much in the opportunity to plan as in the opportunity to develop her own mathematical understanding with her colleagues.

## Plan

During the lesson planning stage, teacher participants access outside sources of information – both print (e.g., innovative materials and research articles) and human (e.g., outside educators, content specialists, researchers). Teachers collaborate with their colleagues in planning a lesson (the public lesson), and then set out to conduct exploratory lessons, constantly tweaking and reflecting on the scope of their lesson and the overall project. This often results in planning a three- or four-lesson sequence with one feature lesson that becomes the public lesson for formal observation. A common planning template may be used; for example, each lesson developed in this project demanded a three-part lesson format with an activation component, a development/inquiry-based component and a consolidation component. Planning may also involve selecting students to take part in the public lesson (selecting targeted students may be desirable to allow the team to focus on certain learning objectives).

The teacher in this video clip is exploring, with her lesson study team and researchers, what the lesson might look like and how students might interact with each other and with the materials/technology provided.

## Between Stages 2 & 3

Teachers in our study identified ongoing backstage activities that carried on between stage 2 (planning) and stage 3 (lesson implementation). These included emailing one another with questions and suggestions (one team used a Wiki space for this), further experimenting with manipulatives and interactive whiteboard use, acclimatizing students to video use in the classroom and, most importantly, conducting exploratory lessons.

Exploratory lessons allow lesson study participants to see in advance of the public lesson how different elements of their lesson may function with different students with a view to understanding student learning and to making refinements to the lesson.

In this clip, teachers are discussing the value of the exploratory lessons and what they learned (such as the need for task revisions and determining optimal group size for students) to help revise the formal public lesson.

## Implement

Once the formal public lesson is planned, teacher teams decide who will implement the lesson. On the day of the public lesson, the teacher team and invited observers meet to discuss the development of the lesson. The group discusses what they learned and how their lesson evolved through exploratory lessons. Further, they outline what the public lesson will look like and what they would like observers to look for. These types of meetings are enriching to not only the teacher team, but also to the observers and researchers. Understanding how the lesson evolved helps the group to more deeply understand what they are observing.

The public lesson is vital to lesson study. It is the day that the substantial work within the lesson study process culminates before colleagues, observers and researchers. It is the instrument that enables formal data collection to occur with an eye to learning more about student understanding and effectiveness of the lesson itself. During the public lesson, all observers make field notes based on [observation guides](#) or guiding questions provided by the lesson planning team. We have found these guides to be very helpful in focusing the discussions on issues and ideas the lesson study team are interested in examining closely.

This clip is taken from one school's public lesson in May of 2009, in a Grade 9 classroom. Clips from the activation, development and consolidation parts of the lesson are documented here. In this lesson, students are learning about volume; they are taken through a 'Minds On' activity on the interactive whiteboard, followed by group work (in pairs) to investigate the volume of a range of prisms while rotating through stations. The students then come together at the end of their investigations to share their findings as a whole group. The teacher then poses a more challenging question, discovered by other students from one of the previous exploratory lessons, for these Grade 9 students to think about.

## Between Stages 3 & 4

After the public lesson, teachers often experience a collective sense of accomplishment, and the debrief provides an opportunity to acknowledge this. Most importantly, the debrief provides a chance for teachers to reflect on their practice. The immediate reflection-on-action teachers engage in often includes thoughts about: a) what might have been done differently to meet the needs of students even more explicitly; b) how the lesson could have been modified to solicit other particular kinds of thinking and representations of understanding from the students; and c) how to solve logistical issues such as optimal student groupings, and pacing of the lesson. At this time, the entire group should take a few minutes to pause for personal reflection and to make sense of their field notes taken during the observation of the public lesson.

In the following clip, a facilitator outlines the protocol for debriefing a public lesson. This protocol ensures that everyone contributes while carefully honouring the teacher who taught the public lesson and the lesson planning team.

Steps include:

1. The teacher who taught the lesson speaks first and describes how (s)he felt about the lesson.
2. Teacher colleagues who also planned the lesson speak, describing how they felt the lesson went.
3. The observers are then given the opportunity to share their observations based on the [observation guides](#).
4. The group discusses key learnings from the public lesson and often discusses next steps for future practice.

## Debrief

The debriefing session is designed to enable communication amongst participants about student learning and teacher learning. The debrief stage drives the continuation of the cycle as the next set of goals is established. The final phases of the cycle – implementation / reflection / debrief – should feel less like a final performance and more like a catalyst for further study and improvement of practice (Lewis et al., 2006). This is often a site of deep learning for teachers; for example, one teacher team taught multiple exploratory lessons before realizing the importance of leaving time for consolidation. They recognized that they, like many others, were focused on “covering” curriculum, rather than teaching it in depth. The debrief is an opportunity for colleagues and observers to provide fresh feedback on teacher practice that is both positive and constructive. Teacher teams collaborate on the lesson development and implementation together. In this way, they rise and fall together, offering a foundation to more effective lessons in the future that lead to greater student understanding.

In this clip, there are two segments: 1. In the Teacher Debrief, (see ‘between stages 3 & 4’), the teacher who implemented the lesson discusses her thoughts on how the lesson went and things she noticed while teaching. 2. In the Participant Observer Debrief, we listen to a team member share his observations of the public lesson.

## Between Stages 4 & 1

After the formal debriefing session where the teachers and observers discuss the lesson, the planning teachers often regroup informally as a small team. In our research, teachers expressed how valuable it was to have these opportunities to continue the dialogue as a team. The teachers immediately began planning the follow-up lessons based on the observations of the public lesson. This included revising plans that the teachers had already developed and finding ways to ensure that all students (beyond those involved in the public lesson) had the opportunity to participate in the lesson.

Much later, teachers continue to re-evaluate their learning and student learning. In this clip, a teacher is reflecting on her earlier experiences as the public lesson teacher and the benefits of watching the lesson with researchers while re-viewing the videotape made of her class during the public lesson.