



Third International Mathematics and Science Study
Replication

TIMSS-R Video Study

DATA COLLECTION MANUAL

LessonLab Inc. of Los Angeles, California

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Overview

TIMSS-R Video Study

This manual describes data collection procedures for the video component of the Third International Mathematics and Science Study Replication, known as TIMSS-R Video Study.

TIMSS-R Video Study is a cross-national study of eighth-grade mathematics and science classrooms. The study involves videotaping and analyzing teaching practices in more than one thousand classrooms in six countries.

The study is funded by the U.S. Department of Education and the National Center for Education Statistics (NCES) and conducted by LessonLab, Inc. of Los Angeles, California.

Goal of the Study

The TIMSS-R Video Study has the following six goals:

- To investigate mathematics and science teaching practices in U.S. classrooms.
- To compare U.S. teaching practices with those found in high-achieving countries.
- To discover new ideas about teaching mathematics and science.
- To develop new teaching research methods and tools for teacher professional development.
- To create a digital library of images to inform U.S. educational policy.
- To stimulate and focus discussion of teaching practices among educators, policy makers, and the public.

Method of the Study

Samples. To achieve our goals we will collect data from 100 randomly sampled schools in each participating country. There are three sources of data: videotaped lessons, teacher and student questionnaires, and supplementary materials used by the teacher and students during the videotaped lessons.

Data collection. One videographer will be sent to each school to videotape both mathematics and science lessons and to hand questionnaires to the teacher after the videotaping. Supplementary materials will either be given to the videographer after the class or sent back to LessonLab by the teacher.

Video cameras. Two digital video camcorders will be used to videotape each lesson. One camera will be operated by the videographer to document mainly the teacher, and the other camera will be used as a stationary camera to document mainly the students. In the rest of this manual we will call the first camera the “teacher camera” and the second camera the “student camera.”

Videotapes. Each tape used to videotape the lesson will be labeled and shipped back to LessonLab by the videographer. To avoid accidental loss of the tapes, the videographer should ship the tapes after every two schools via FedEx or another similar shipping service with a reliable tracking system.

Data processing. The tapes shipped back to LessonLab from the videographers will be digitized and burned onto CD-ROM. All the lessons will be transcribed/translated into English and timecoded. The teacher camera videos will be linked to the transcripts and stored in a multimedia database.

Data analysis. The video data will be reviewed by our research group who will code various aspects of lessons to describe mathematics and science teaching in each country, and the results of the coding will be analyzed statistically and reported to NCES by LessonLab.

Importance of Standardized Camera Procedure

As a videographer you must make many decisions about where to point the camera. At any given moment you might focus on the teacher, the students, or the chalkboard. You might frame the shot close-up or wide.

It is of critical importance that these decisions be made in a standardized way so that the tapes we collect are comparable across different countries and different classrooms. Not following standard procedures could bias our view of what is happening in the lesson, or it could keep us from seeing some aspect of the lesson that is important for our analysis.

Chapter One: Data Collection Procedures

To line up each taping requires a tremendous amount of work and represents a huge expense so it is of extreme importance that the videographer attend to every detail of the job in order to avoid mistakes or oversights. Often the videographer will be working under extreme time pressure and therefore it is essential that he or she be very organized and methodical. Below is a step by step description of everything the videographer will need to do before, during, and after every taping. A series of checklists are also provided with this manual and should be used each and every time that the videographer goes out into the field.

1.1 Before Going to the School

Charge Batteries

- Make sure that all of your camera batteries have been recharged.
 - Both the transmitter and the receiver of the lavalier radio microphone use 9-volt batteries. Put a fresh 9-volt battery in both the receiver and transmitter before each taping.
- Remember also to always carry plenty of spare batteries with you.

Check Equipment

- Pack all your equipment using the checklist provided in the appendix.
 - Always use this checklist. There are lots of little pieces of equipment that are of crucial importance but which nevertheless are easily forgotten.

Check Directions to School

- Make sure you have gone over the directions to the school and that it is clear to you how to get there and where to park your car.
 - Pack these directions as well as the school phone number. Also make sure that you pack the name of the principal of the school or of your official contact person, as well as the name of the teacher you will be taping.

Pack Questionnaires

The videographer will also be responsible for delivering questionnaires to the teacher. The questionnaires will be used to help interpret the video and must be completed soon after the taping. Make sure that you pack a box/envelope that contains teacher and student questionnaires, several barcode labels and instructions to the teacher. The questionnaires with labels will be shipped back by

the teacher in the self-addressed mailing envelopes to LessonLab or to our country collaborator in each country.

1.2 Arriving at School

Arrive One Hour Early

- Make sure you arrive at school one hour before the scheduled shooting.

A lot of work will go into scheduling a taping. If you get there late it will be a minor tragedy, so plan to get there an hour before the taping is scheduled.

Meet First with School Officials

- When you arrive at school, go to the school's main office and meet the contact person.

You should never go directly to the teacher's classroom. Always go to the main office first and meet with the principal or the person who has been assigned as your official contact person. In many schools you will be expected to make a stop by the office on your way out to sign out or report back to your contact person. Find out exactly what they want you to do after you are done taping.

1.3 Once in the Classroom

As soon as you get to the classroom where you will shoot the lesson, two factors will help you determine where to position the camera: 1) information about what will happen during the lesson, and 2) the physical arrangement of the classroom.

Ask the Teacher about the Lesson

- Try to find out from the teacher about what will happen in the lesson.

Often there will be little time for you to talk to the teacher because even though you arrive early, he or she might be busy teaching. However, if you have a chance, ask the teacher and find out as much as possible about the lesson.

- The information you want to find out is:

roughly how long the lesson will last (longer than 60 minutes?)

general outline of the activities of the teacher and students that will take place during the lesson

whether the chalkboard will be used

which chalkboard, if there are more than one, will be used

whether AV materials will be used and where they will be placed

whether there will be a homeroom meeting before the lesson starts (Note: do not tape homeroom activities)

Choose Camera Positions

- Try to set up the cameras with the windows at your back, thereby avoiding back light problems.
- Close windows, doors, and blinds as needed to adjust the light and reduce noise.

Make sure the teacher doesn't mind before you do any of this.

- Find the location of the nearest electrical outlet.

If at all possible you will want to plug your camera into this outlet so that in the unlikely event of a battery failure you can use electricity as a back up while you replace the battery.

- Move student desks as needed to set up the cameras.

We are interested in how desks in classrooms are arranged so you should not ask the teacher to significantly alter the lay out of the classroom. However, it is fine to scoot a few desks over in order to have better visibility. Before you move any desks make sure that the teacher doesn't mind.

Attach Barcode Stickers to the Tapes

Before you put the tapes in the cameras, make sure you attach a barcode sticker to each tape.

Shoot Time Clock

Shoot the time clock with each camera. This will help us to synchronize the tapes later.

Class Cancellation

If class is canceled, please contact your country's scheduler for further instructions.

Fire Drill

If a fire drill interrupts class, leave the equipment and follow the class outside.

1.4 After Taping the Lesson

Give the Questionnaire Packet to the Teacher

After you are done taping you will give the teacher the box or envelope that contains teacher and student questionnaires, instructions for the teacher, and mailing envelopes for the teacher to use. Remind the teacher that it is essential that he/she completes the teacher questionnaire before the day is over.

Pack Up

All equipment should be packed using the equipment checklist so that nothing is forgotten.

If you used more than one tape per camera to shoot a long lesson (more than 60 minutes), make sure you attach a barcode label to each tape before the tapes get mixed up.

Completing the Log Sheet

The tapes collected must be accompanied by a log sheet that you fill out. This log sheet should be completed while the taping session is still fresh in your mind (i.e. no later than the evening of the taping). Log sheets should be returned to LessonLab with the tapes. Make sure that each log sheet has the barcode sticker attached that is the same as the ones on the tapes.

Shipping the Videotapes

To ship the videotapes into the United States, you will have to fill out various shipping forms. Please refer to Appendix 5 for more instructions.

1.5 A Note on Behavior and Dress Code

- Always try to be polite and considerate.

You should always remember that teachers have volunteered to let us video tape their classrooms. So please be polite and considerate and thank the teacher profusely. In addition some teachers will be very nervous so try to make them feel comfortable. In general you should try to not be a burden and make your presence felt as little as possible. However, make sure you collect all the materials teachers have agreed to give us.

- Dress appropriately.

You are visiting schools not as an individual videographer but as a representative of TIMSS-R Video Study. Always dress appropriately based on the standard in your culture.

- Do not eat, drink, or chew gum while in the classroom.

Chapter Two: Documenting Lessons

Classrooms are complex environments where many things are occurring at once. In this chapter, we describe which aspects of the classroom environment we want to document. We discuss how to locate the two cameras in the classroom, one stationary and the other operated by you. And, we present some general rules, as well as some specific guidelines, designed to help the camera operator make consistent decisions about where to point the camera and how to shoot the action being documented.

2.1 Goals of Videotaping

As mentioned earlier in this manual, the main objectives of this project include investigation of mathematics and science teaching in the U.S. and in other countries and the comparison of classroom instruction across countries. The goal of videotaping lessons is, therefore, to document what is happening in the classroom. The objectives of the study will not be achieved if videotaping of lessons is done inconsistently across countries and videographers. It is of crucial importance to the project that all the videographers strictly follow the procedures developed for this project.

2.2 Shooting in Real Time

Because we want to see each lesson in its entirety, all videotaping will be done in real time. The camera will be turned on at the beginning of the class and not turned off until the lesson is over. This means that we can study the duration of classroom activities by measuring their length on the videotape. Obviously, this would not be possible if there are any gaps in the recording.

The tapes will not be edited, but viewed from beginning to end in real time. This means that you must attend to what is being captured on the tape at all times. Nothing will be deleted. If you are used to editing, taping in real time will take some getting used to.

2.3 What to Document

Classroom lessons are complex. What kinds of things need to be captured in the videotape? To answer this question, imagine you are an observer. You walk into the classroom to see what is going on. What do you look at? You cannot look at everything; decisions must be made from moment to moment about what to include and what to leave out.

When you are in a mathematics or science classroom observing the lesson and trying to understand what is happening, you will probably attend to three things:

the teacher, the students, and the tasks. These are the three things we want you to document.

Document the Teacher

During the lesson, teachers engage in a variety of activities. For example, they explain concepts and procedures, pose problems, assign tasks, ask questions, write information on the chalkboard, walk around the classroom and assist individual students, etc. Because the main goal of this project is to study teaching in different countries, it is necessary that we thoroughly and carefully document the teacher's activities and behaviors during the lesson.

Make sure that you capture what the teacher is doing, what he/she is saying, and what information he/she is presenting to the class.

Document the Students

When you are observing a lesson in a classroom, you would not only look at the teacher all the time but look at the students as well so that you understand what goes on in the classroom. Make sure that you capture what students are doing and saying during the whole-class interaction, when they are working in groups and on their own. Focus mainly on the activities and behaviors of the students who are interacting with the teacher, but turn to other students as well from time to time because students might be doing different things when the teacher is and is not with them. Of course you cannot document everything that every student says and does. The goal is to sample student behavior so that what is portrayed in the videotape is representative of what actually happened in the lesson.

Document the Tasks

During mathematics and science lessons, teachers assign various tasks to students. Normally the teacher presents the task to students clearly enough that students understand what they are supposed to do, and it is usually not hard to see in the video what the task is. This is not always the case, however. If the task is ambiguous or poorly described, many students will be uncertain how to proceed. Or, if the class is broken into small groups, each group may be working on a different task.

In all cases, what we want to see on the video is the task that students are actually engaged in doing, whether or not it is what the teacher intended. To see clearly what students are doing it is often necessary to zoom in close enough to capture what at least a few of the students are working on. Make sure you document how students are actually doing the assigned tasks.

2.4 Placing the Cameras

The Two Camera Strategy

We are using two cameras in this study. One will be stationary. It typically will be placed up high on a tripod along a side wall near the front of the room, set to the widest shot possible, and used to capture as many students in the classroom as possible. We will refer to this as the “student camera.”

The videographer will operate the second camera. It, too, will be placed on a tripod, but will also be removed from the tripod whenever it is necessary to document the lesson. It will generally be placed between 1/3 and 1/2 of the way back from the front of the class, and will more often than not focus on the teacher and his or her zone of interaction. We will refer to this camera as the “teacher camera.”

The physical arrangement of classrooms and the activities that take place within them vary greatly. The videographer must decide where to place the cameras so that the documentation requirements outlined above can be met to the greatest possible extent. It is helpful, if possible, to talk with the teacher before the class begins to find out generally what is going to happen, and where the action will take place. The camera should be placed so that it can easily tape the main chalkboard or audiovisual device, the teacher, and some of the students in a single master shot. The position should also allow for easy panning to other areas of the classroom.

Rationale for Camera Placement

It is not possible, due to varying classroom configurations, to define a single best position for the teacher camera. However, we have found that placing the camera along the side, 1/3 to 1/2 way back, works best in most classrooms.

This position allows good views of the board in medium and close-up shots, as well as good shots of the teacher’s and students’ faces in a wide master shot. This position also allows for quick panning to the front and rear of the room as well as an ideal view of the opposite side of the room especially if there is a supplementary chalkboard in that location.

Why not set up in the rear of the room? Although setting up in the rear of the room offers a good view of the entire classroom it also has two major disadvantages. The students are only seen from behind, and the camera will most likely have to zoom in to frame the front of the room, which will tend to accentuate camera movement.

Why not set up in the front of the room? Setting up too close to the front of the room results in oblique angles that make it difficult to see what the teacher is doing and to read the board.

The student camera should be mounted as high as possible so as to give the least obstructed view of what the most students are doing. Placing it on the side, a few

feet from the front, will usually work best, and it should usually be on the same side as the teacher camera. This is important because it reduces the likelihood that the student camera will be included in the teacher camera's shot.

Light Sources

Both cameras should be set up on the same side of the classroom as the largest set of windows, thus keeping the major light source at the camera operator's back. This orientation will minimize overexposure due to backlighting. This position also allows a good view of the supplementary chalkboard that is often on the opposite wall from the windows.

If the classroom has windows on both sides of the room, choose the side that looks best overall. Be sure to maintain, however, careful manual exposure of the foreground. In any case, the camera's exposure should be set to manual and adjusted according to the situation (See "Exposure" below).

Also keep in mind that it often is possible to pull window shades if you feel positioning the camera opposite the windows would be a better alternative. In fact, often you will need to pull the blinds even if the windows are behind you so as to avoid reflection on the board or other equipment.

Tripod versus Hand-Held

Whole Classwork. It is preferable to keep the camera on the tripod during periods of whole classwork (when the teacher and/or a student is at the board). Circulating through the classroom can be distracting and can make the camera the center of attention.

Independent Work. If independent seatwork occurs for more than 2-3 minutes, it is preferable to handhold the camera, so that you can more closely capture individual interactions and students' work. Below are some examples of seatwork:

When the teacher assists students individually or as a small group.

When students break into groups and work on assigned tasks.

When students gather to work around a computer

During these activities, take the camera off the tripod, handhold it, and walk around the room for the duration of the seatwork period. Try to remove the camera smoothly from the tripod so that you will not lose the action you are documenting. Then, at the end of the seatwork period, put the camera back on the tripod as smoothly as possible.

Keeping track of the teacher. It is very important to keep track of the teacher during periods of independent work. If the teacher is interacting with students, it is particularly important to capture these interactions. Most likely, during periods of independent seatwork you will be filming the teacher interacting with students, using a medium or wide shot. However, you should also try to

periodically capture students' work, including what they have written on their paper, the materials they are using, and their textbooks.

Finding opportunities to shoot students' work. Shooting students' work means getting close-ups that are readable to a viewer. Try to get at least one good shot of a student's work. Ideally try to shoot as many different students' work as possible, without losing track of the teacher. One opportunity for shooting students' work is when you are filming the teacher providing assistance. Another opportunity is when the teacher is not doing anything, and you see a student whose work you could easily shoot.

The close-up shot. Getting a good close-up shot of students' work presents a somewhat difficult situation for the videographer. In order for the shot to be effective, the viewer must be able to read what the student has written. Such shots are critical for the viewer to know exactly what work students are doing, or have done, at their seats. However, getting this kind of shot can be disruptive to the student. Therefore, you will have to use your judgement as to when it is appropriate to attempt these close-ups.

For the ideal close-up shot, you should stand behind the student (or possibly to their side), zoom in, focus carefully, and film everything they have written. Please be aware that the camera only needs to be in this position long enough to zoom in and focus, because viewers can easily freeze this frame of video.

Practice removing the camera from the tripod and placing it back on the tripod while you maintain a shot. This needs to become a smooth and automatic movement.

Other Issues to Consider in Placing the Cameras

There are still some other issues you will need to consider when choosing the camera positions in a classroom.

- Overhead projectors, slides, multiple AV presentations.

You should take into account the audiovisual materials that will be used so as to position yourself at a vantage point from which you can best capture see them.
- Direction in which students are facing.

Try to position the teacher camera so that you can see the faces of at least some of the children (if not the majority). This will reduce the chance that you have to remove the camera from the tripod.
- Clear view.

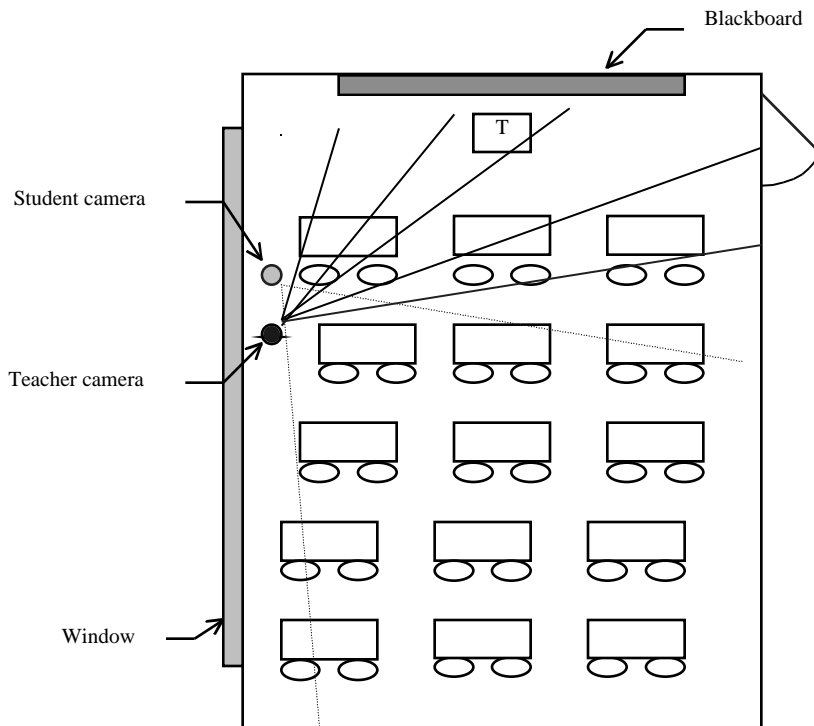
You want to avoid having students sitting directly in front of the camera because they will block your view. If you find a very good position but a student is in your way, you might want to consider asking the teacher if it is OK to ask the student to move.

Some Common Situations, and Where to Place the Cameras

In this section we will illustrate where to place cameras in a variety of classroom settings with different instructional activities. In general you may find mathematics lessons easier to videotape than science lessons because science lessons are often held in a lab, which tends to be much larger than a regular classroom, and desks are often built-in so that you cannot move them to secure the camera positions. Also science lessons involve demonstrations and experiments that often require a videographer to handhold the camera and move around in the room to document what the teacher and students are doing. In any event, you should always keep in mind in making your decisions of where to place cameras and what to videotape the principles and guidelines described above.

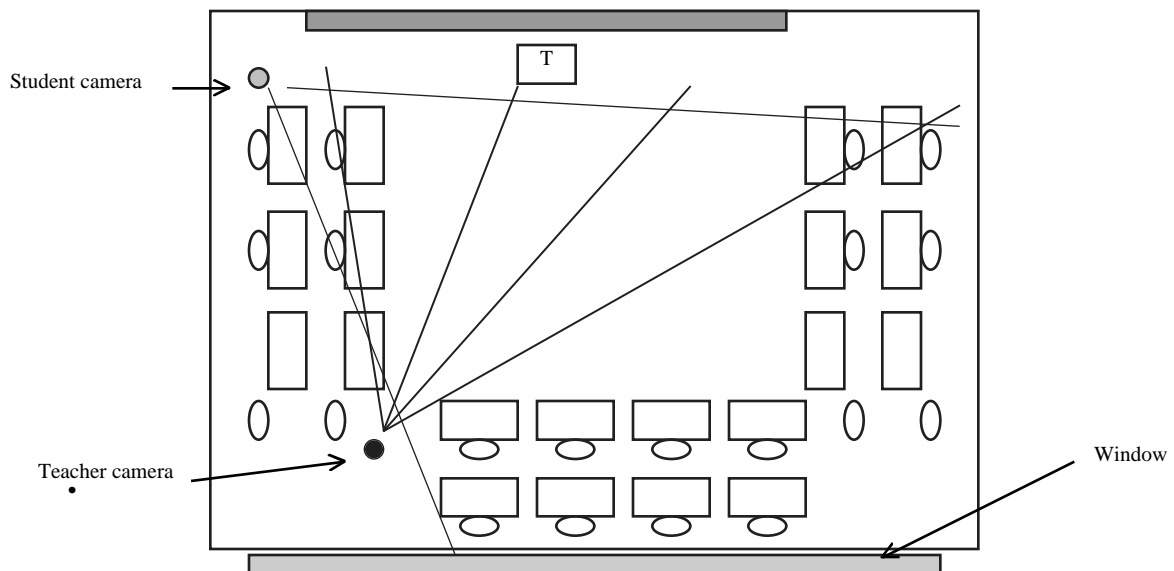
Situation 1: Window Opposite from the Door, Chalkboard at the Front, Movable Student-Desks Facing the Front

This situation is probably the most common classroom setting. You can place the teacher camera by the window, 1/3 of the way from the front, and the student camera near you, leaving it aimed at the students behind the camera. Keep the teacher camera on the tripod as long as you can document what the teacher and students are doing.



Situation 2: Chalkboard at the Front, Window On the One Side, Student Desks Arranged in a U-Shape

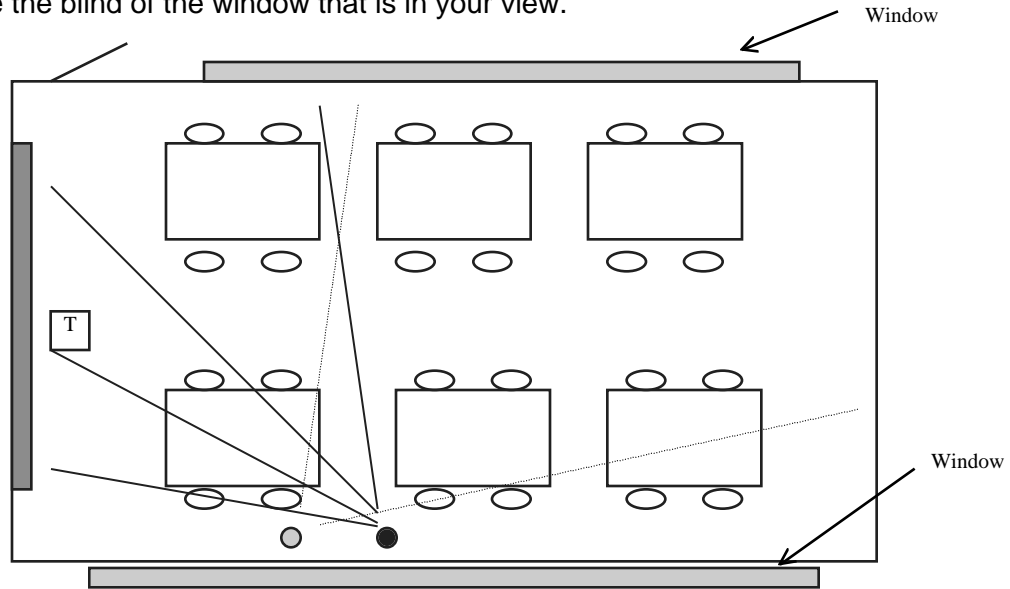
This situation does not allow you to apply the 1/3 view rule. You should place the teacher camera where you have a good view of the teacher and the chalkboard, and students are not blocking your view. Place the student camera in the front corner where the camera is not in the view of the teacher camera.



- Make sure that you set up the student camera as high as possible to avoid students' heads blocking its view.

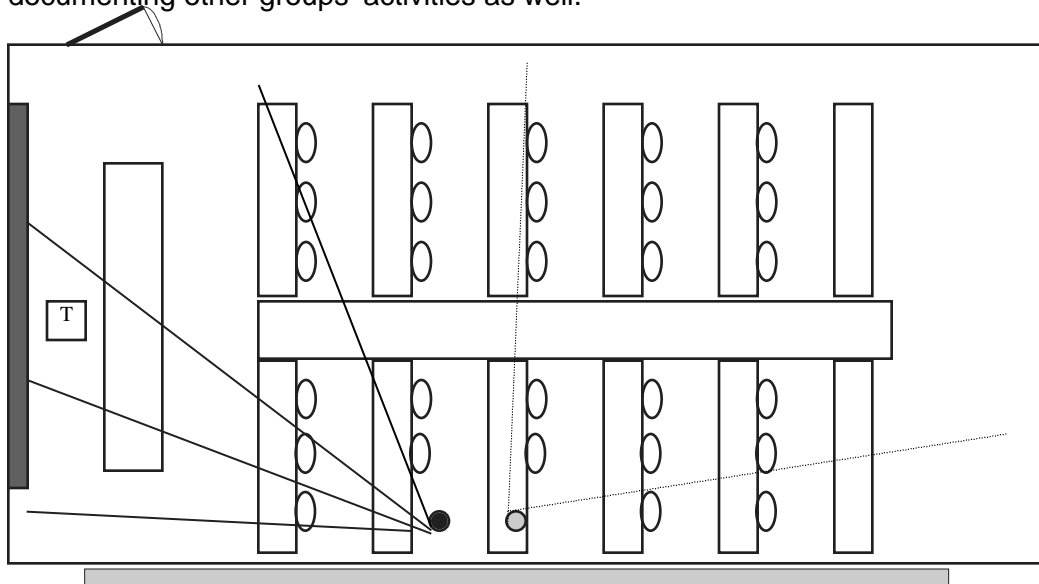
Situation 3: Students Sit in Groups, Windows on Two Sides of the Room

In this situation 1/3 view may apply. Again place the teacher camera so that you have a good view of the teacher. Try to avoid backlighting situation. If possible, close the blind of the window that is in your view.



Situation 4: Large Science Lab, Student-Desks Not Movable

Often science labs are much larger than normal classrooms, and student-desks are built-in so that you cannot move them. Because the room is large, often there are enough rooms for students to sit even if you occupy few seat spaces (see the diagram below). However, make sure you ask the teacher if it does not cause any problem. When group experiment starts, you may need to lower the angle of the student camera slightly so that it captures the group in front of the camera while documenting other groups' activities as well.



2.5 Audio Recording

We are using three microphones to capture audio in the classroom. One is the built-in microphone on the student camera. The other two are fed into the teacher camera through a mixer, mounted underneath the camera. One of these is a wireless microphone worn by the teacher; the other is a small microphone attached to the top of the camera. Be sure to familiarize yourself thoroughly with the use of these microphones.

Always wear headphones while you are taping so you can monitor what the camera is picking up at all times.

2.6 Deciding Where to Point the Teacher Camera

Once you begin videotaping classroom lessons you will see that it is not enough simply to know what needs to be documented. It is impossible to simultaneously capture teacher, students, and tasks. You must decide, at any given moment, where to point the camera, and what to include in the shot.

One thing to keep in mind is that the student camera will always be taking a wide shot of the students. So, although you must sometimes get close-ups of students and their work, the primary focus of the teacher camera will be the teacher and the tasks.

The Perspective of the Ideal Student

Most of the time you can decide where to focus the camera by taking on the perspective of an ideal student in the class. Given what is going on and what the teacher is trying to accomplish, where would the ideal student's attention be focused? This is usually where you want to focus the camera.

If the teacher is lecturing and the students are listening, you probably should focus on the teacher since that is where the ideal student would be looking. But you also should move now and then to get a close-up of what students are writing in their notebooks. If the students have been assigned to work on a task at their seat while the teacher walks around and helps students who are having difficulty, you should probably put most of your focus on the actual task that students are working on, while still keeping track of the teacher.

Keep Track of the Teacher at All Times

Because the teacher is an extremely important part of the lesson, we want to keep track of the teacher at all times. This does not mean, however, that you must always have the teacher in the camera view. We will have audio coming from the teacher's wireless microphone, so as long as you pan back to the teacher

frequently we will be able to find out what the teacher is doing. If the teacher engages in a long interaction with a single student we want to capture it, but also we want to see what the other students in the class are doing.

Some Difficult Situations and Their Solutions

In general, you find it difficult to decide where to point the camera when: 1) separate activities are occurring at the same time, and 2) when events change very quickly. Here are the rules to keep in mind when you encounter those situations:

When Separate Activities are Occurring at the Same Time

If students are working on their own on an assigned task while the teacher prepares materials on the board, it is difficult to document both what the teacher is doing and what the students are working on.

The general solution to this situation is to focus on the teacher for a while, then pan slowly away from the teacher to document what the students are doing. It may be necessary to zoom in to see the task that students are working on. Then move back to the teacher.

Rule: Keep the shot mainly on the teacher but tape students activity from time to time to understand what task they are working on.

When Events Change Very Quickly

Sometimes things change constantly during the lesson. You must listen carefully to what is happening and try to predict what might happen next. This is the only way to be ready to react in time. However sometimes changes will occur very quickly and you are likely to miss what has happened.

If events change quickly and it is clear that the change is only a brief one, it is often impossible to catch the change in time and it is better to let it go. In general you should avoid moving the camera to capture brief events. We are likely to miss them anyway, and rapid moves compromise the quality of our tapes. It is not only the brief event that is missed, but parts of the more enduring event would be missed as well as you try to find your way back to the original event.

Rule: avoid moving the camera to capture brief events.

In the table below we describe some difficult situations that are likely to occur in mathematics and science classrooms and what to do when they occur and why.

Some possible situations

	Descriptions of possible situations	What to do	Why
1	<ul style="list-style-type: none"> • Teacher at the front talking • One student is at the board working on a problem and talking publicly • Rest of the class working individually at their seats 	Focus on the teacher and the student at the board, but find a chance to document what other students are doing	Because we want to document: 1) the teacher, 2) teacher-student interaction, 3) new information on the board, and 4) students' task
2	<ul style="list-style-type: none"> • Teacher walks around assisting the students privately and talks to the whole class from time to time • One student at the board working on a problem • Rest of the class working individually 	Document how the teacher instructs individual students, but document the student at the board and the information on the board when there is a chance	Because we want to document: 1) the teacher, 2) new information on the board, and 3) students' task
3	<ul style="list-style-type: none"> • Teacher stays at the teacher desk assisting students privately • Rest of the class working on their own 	Document how the teacher instructs individual students (move close to them) and document what other students are doing	Because we want to document: 1) the teacher, 2) teacher-student interaction, and 3) students' task
4	<ul style="list-style-type: none"> • Every group works on the same task; • Teacher walks around assists each group 	Document how the teacher assists individual groups (follow the teacher) and also document some groups when teacher is not with them	Because we want to document: 1) the teacher, 2) teacher-student interaction, and 3) students' task
5	<ul style="list-style-type: none"> • Every group works on different tasks; • Teacher walks around and assists each group 	Document how the teacher assists each individual group (follow the teacher) and also document every different group work	Because we want to document: 1) the teacher, 2) teacher-student interaction, and 3) students' task
6	<ul style="list-style-type: none"> • Every group works on a different task, • One group works outside the classroom • Teacher walks around and assists each group 	Same as #5 but find a chance to document the group outside	Because we want to document: 1) the teacher, 2) teacher-student interaction, and 3) students' task
7	Whole class leaves the classroom and work outside	Follow the class and videotape outside; but do not turn off the student camera	Because we want to document: 1) the teacher, 2) teacher-student interaction, and 3) students' task

2.7 How Close to Frame the Shot on the Teacher Camera

The Zone of Interaction (ZOI)

A space within which the action to be documented is occurring is called the zone of interaction (ZOI). For example, if one student is at the board writing something and the teacher is standing beside the student and asking questions to him/her, the ZOI includes the teacher, student, and the board (see the example below).

There are two types of ZOI: central and split. The ZOI is called *central* when it can be framed within a single shot. When it cannot be captured within a single shot, it is called *split*. Below are some examples of difficult situations of ZOI and the general rules to follow in those situations.



Aside from making sure that all videographers point the cameras at comparable things, we also need to make sure that their shots are framed in comparable ways. An extreme close up of the teacher talking would provide a very different sense of the action taking place than a wide shot where the teacher is seen in the context of the classroom.

The Master Shot

In general, we want the widest shot possible because that gives us the most information. And in general that means that you will use a shot called the Master of Scene (MOS) or, more simply, the “master shot.”

The master shot is achieved by zooming the lens out completely, allowing for the widest most encompassing view of the whole scene. By using a master shot we will be able to get as complete a picture as we can of the activity taking place in the lesson.

For example, a central ZOI, which encompasses the teacher talking to the class, could be captured with a zoomed in shot of the teacher's face or of the teacher from the waist up; this would probably be the nicest shot from an aesthetic point of view. However, from our point of view the preferred shot is still the master shot because it is the one that will give us the most information about the context within which the action is occurring (see the picture below).

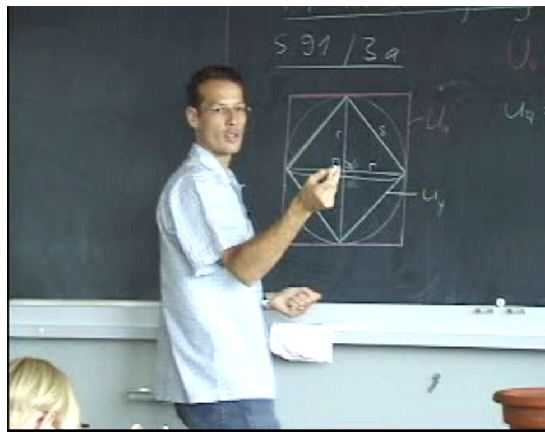
Also, the master shot is less prone to bias because it does not artificially focus the viewer on whatever aspect of the lesson the videographer judges to be most interesting.



The master shot

The Medium Shot

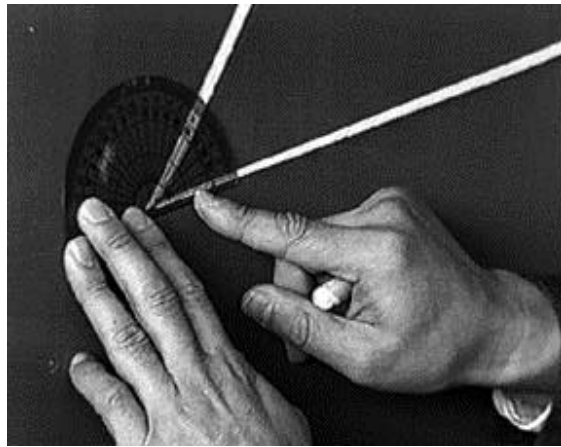
This shot frames a single individual or large object. The medium shot is not a close-up and not very wide (although in certain circumstances you will need to zoom all the way out to achieve a medium shot). For our purposes framing the teacher or any other individual from the thigh or waist up to six inches above his or her head will be called a medium shot.



The medium shot.

The Close Up

This shot closely frames anything or anyone. For instance, if the teacher holds up a manipulative or refers to something small, and it is important that we see it, you should zoom in and tightly frame that object. (Note that this will affect focus.) In other situations it may be necessary to make a close-up of what a student is doing at a desk or an item on the chalkboard.



The close up.

The Group Shot

This shot frames the teacher and a group of students, or any relevant group of individuals. Note that this shot can be achieved by either a wide-angle zoom or a longer focal length zoom, depending on the camera's distance from the group. (If the camera is handheld it is wise to keep the lens as wide as possible while adjusting the frame by moving closer or farther away from the group. This maximizes the depth of field, and minimizes camera movement making it easier to keep more in focus.)



The group shot.

The Two Shot

This shot frames any two individuals, most typically the teacher and the student that he or she is talking to. Again, the focal length of the zoom lens is determined by the distance the subjects are from the camera. (In handheld situations, it should remain medium to wide, adjusting the frame through camera to subject distance).



The two shot

Some Example Situations and How to Handle Them

Situation 1: When Two Speakers Will Not Fit in a Single Shot

When the ZOI is split between different speakers, then you should move the shot from speaker to speaker as they take turns talking. There is however, an exception to this rule. If one of the speakers is taking such brief turns of speech that you do not have enough time to go to this speaker before his turn is over, just keep the camera on the person doing the most talking.

- Rule: move from speaker to speaker as they take turns talking if the turns are long enough.

Situation 2: When the Speaker is Far from the Object Being Discussed

This situation happens frequently for instance when a student in the back of the classroom is talking about things written on the chalkboard. In this situation, the general rule is to keep the shot on the speaker. But before settling on the speaker you must first move the shot over to the object and document it long enough to provide the visual information needed to make sense of the talk. For example, if the teacher is talking about a problem on the chalkboard or a geometric shape, first tape these objects and then move to the speaker.

- Rule: keep the shot mainly on the speaker but capture the object first.

Situation 3: When the Speaker is Close to the Object Being Discussed but They Will Not Fit in a Single Shot

For example, the teacher is holding up an object and describing it, but in order to see the object clearly you need to zoom in closely and thus exclude the teacher from the frame. The ZOI presents a split because the teacher and the object cannot be captured in the same shot.

Also, if the speaker is pointing to specific features of the object as she talks, and if the direction of the points must be seen in order to understand the talk, then you must zoom in on the object to understand the teacher's talk.

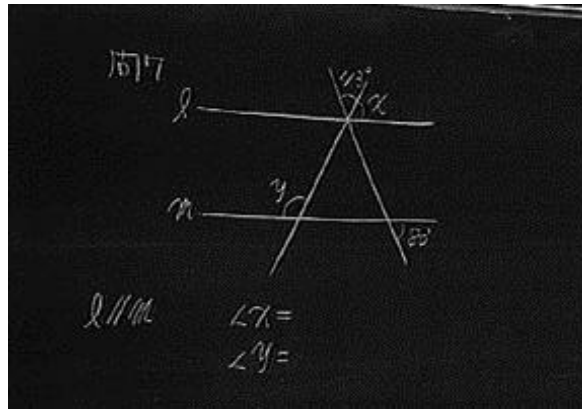
- Rule: keep the shot mainly on the speaker but capture the object first or whenever the speaker points to specific features of the object.

2.8 Taping the Chalkboard and Overhead Projector

Because teachers often use the chalkboard or an overhead projector we will discuss in some detail how to handle these situations using the guidelines that were discussed above.

Chalkboard

Things written on the board during lessons are treated the same as other objects that get talked about. The camera usually has to zoom in tighter than a master shot in order to capture the information being presented. In fact, writing on the board is often so small that you will find yourself in a split situation where to read the writing you will lose the teacher from the shot. In any case, it is important to zoom in close enough--and for long enough--so that the writing on the board is clearly legible on your small, 4-inch LCD monitor.



Getting closer to read the chalkboard.

On the other hand, it is not necessary to stay in close for very long in most instances. We always prefer the master shot. So if something is being written on the board, and if it seems to take a while for the person to finish writing, stay on the master shot until the person is finished writing rather than immediately going in to capture what is being written. Then zoom in and capture what is on the board. The exception to this rule would be if in order to understand what is being said, you need to see what is being written as it is being written. (This often happens when the teacher is talking about what she is writing as she is writing it.)

One common mistake is to zoom in too close and for too long on the chalkboard. Often you can read what is on the board with a medium shot and you do not need a close up. Or, if you do need a close up you do not need to hold it for very long. Once you have captured what is on the board you can often understand a discussion of its contents without zooming back in. If you can remember enough of what is written to easily follow the discussion from a wider shot, the viewer probably will be able to also.

When the contents of the board changes you must zoom back in to document the change. We must be able to know what is on the board at all times.

Overhead Projector

Teachers use overhead projectors (OHP) in much the same way as they use the chalkboard. Generally speaking, the OHP should be photographed in the same way as the chalkboard. However, overheads present a special difficulty for the cameraperson because the aperture has to be changed in order to see what is being projected. Because zooming in and out of an overhead projection presents a challenge for the cameraperson; we allow the camera to remain more static when shooting overhead projections than when shooting the chalkboard or other objects. In general, you can forgo returning to the master shot if it is clear that the OHP will be modified soon. This will help you avoid a lot of zooming in and out while adjusting the aperture.

Be sure to practice smoothly and quickly changing the camera settings so as to capture the OHP projection. This happens frequently, and it is essential that you not miss what is being projected.

Chapter Three: Camera Work

Now that we have discussed what you are expected to tape, we will give a more detailed description of the basic camera moves that you will be asked to carry out.

- It is important that the viewer's attention be directed towards events in the classroom and not the actions of the camera or the camera operator.

If your images are jerky or if they do not follow certain basic cinematographic conventions, they will look strange and the focus will be taken away from the classroom events.

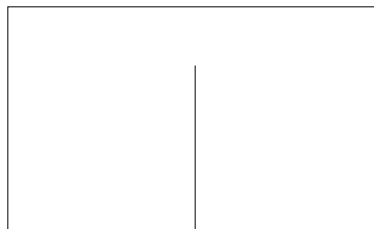
Below we will discuss some basic principles and conventions that should guide how you frame and compose your shots. We will also briefly discuss some tips for achieving smooth camerawork.

3.1 Framing and Composing

Basic Principles

In composing your shots you should be guided by the notion of visual weight. If your shot is not balanced it will produce a sense of unease in the viewer, which can be quite distracting.

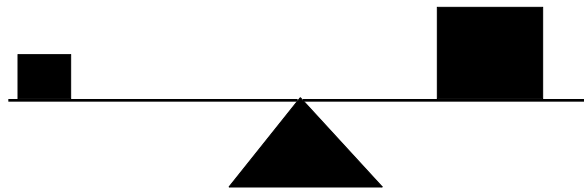
When something appears in the image frame, it draws our attention and we look at it more than we would look at an area that contains “nothing”. If something draws our attention it is said to have visual weight. Certain things carry more visual weight than others. Large items draw more attention than small ones. Moving, energetic elements have more weight than static elements. Complicated shapes draw more attention than simple shapes. People usually carry more visual weight than file cabinets. Also certain areas of the frame carry more visual weight than others. Elements in the center of the frame tend to exert less visual weight than elements at the edge of the frame. In fact the closer an element gets to the edge of the frame and the further it gets away from the “felt axis”(see figure below), the more visual weight it will have.



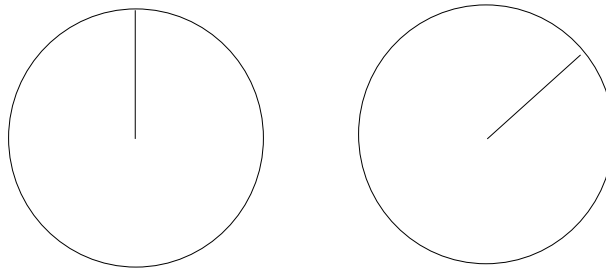
The "Felt Axis"¹

¹ Figure taken from Dondis, Donis A. (1977), *Primer of visual literacy*. Cambridge, Mass.: MIT

In addition, equilibrium is our strongest visual reference and greatly influences our sense of visual weight. All visual patterns have a center of gravity that is immediately intuited. The horizontal-vertical construct is the basic relationship between our environment and us. Our internalized awareness of steady uprightness is always in relationship to a stable base. If we are thrown off our center of gravity, we push an arm or leg out to regain our balance. As picture elements move away from the felt center of gravity, they carry more visual weight as shown in the figures below.



Something small and near an edge carries more weight than something larger at the center²



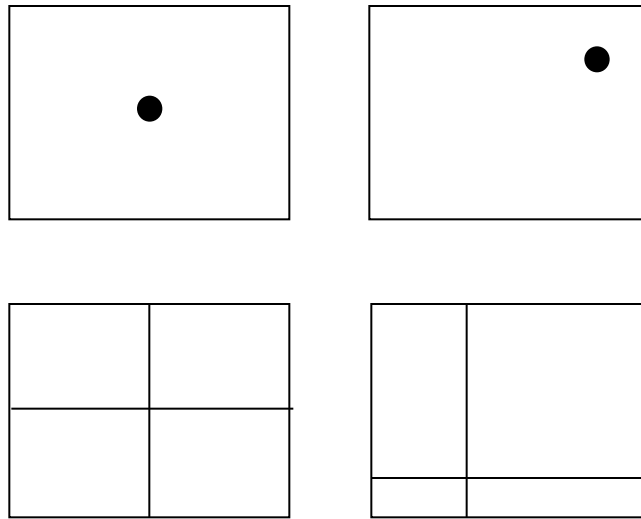
The circle with the "tipped" or non-conforming radius attracts the most attention.³

In composition, harmony and stability are the opposite of the visually unexpected and stressful. For instance, the placement of a dot in the center of the frame feels balanced and harmonious. By contrast, a dot or line placed off the felt axis carries more stress and more visual weight. To balance it, you must place another picture element opposite it (see Figure below).

Press.

² Figure taken from Dondis, Donis A. (1977), *Primer of visual literacy*. Cambridge, Mass.: MIT Press.

³ Figure taken from Dondis, Donis A. (1977), *Primer of visual literacy*. Cambridge, Mass.: MIT Press.

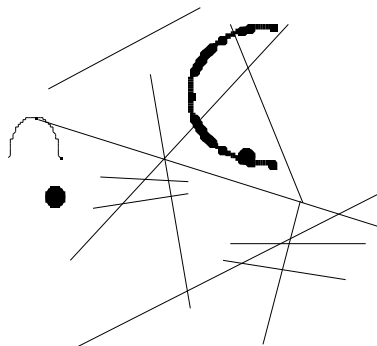


Comparison of balanced and un-balanced compositions due to differences in visual weight.⁴

Compositions that are bilaterally symmetrical do this well and harmoniously. However, compositions can also be balanced asymmetrically by combining image elements of different visual weights in different areas of the composition. The point is to move the viewer's eyes throughout the composition, favoring the image elements that are most important.



Symmetrical



Asymmetrical

Examples of symmetrically and asymmetrically balanced compositions

Most of the time you will be balancing the teacher and something else such as the chalkboard or a student. This means that generally you will be working with asymmetrical compositions. Your goal should be to make these compositions

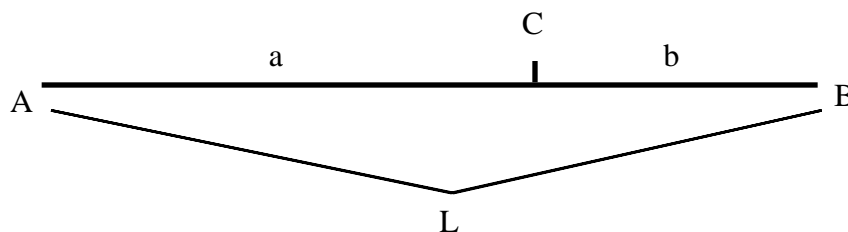
⁴Figure taken from Dondis, Donis A. (1977), *Primer of visual literacy*. Cambridge, Mass.: MIT Press.

balanced and to make sure that they direct our attention to the most important elements in the frame. In other words you do not want a filing cabinet to carry more weight than the teacher instructing the class. In balancing your shots it will also be useful to keep in mind that the direction of the principal actor's gaze also carries visual weight. Sometimes called a vector, the direction of a gaze can be thought of as a powerful line that is irresistibly followed by the eye. Because of this, the direction of this vector must be balanced by the rest of the composition. For instance, if the teacher is looking at the students toward frame right, you will probably need to position the teacher to the left of the frame just enough to balance the weight of his or her gaze.

Composing Along the Golden Section Lines

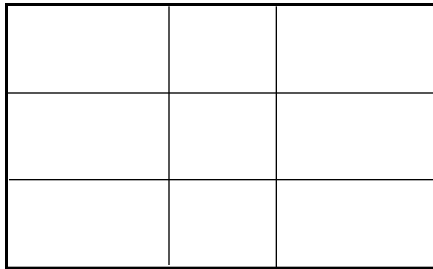
As mentioned earlier, if you do not follow certain conventions you can create images that feel strange and call attention to themselves. One of these conventions is known as the Euclidean "Golden Section" (from Euclid II, 11). This method of cutting a line or other geometric form into "golden" proportions has been known and used in western art, mathematics and architecture for over 2000 years and is still evident today. The Golden proportion was used by the Greeks to design much of what they built from the classic Greek Amphora, to the floor plans of temples and their elevations. Although we do not have the space here to discuss this further, suffice it to say that the Golden Proportion has had much influence over the organization of aesthetic production in Western history, and it should serve us adequately as a standard.

Euclid first demonstrated this proportion by cutting a line L , into two segments a and b , so that $b/a = a/L$, or $BC:AC=AC:AB$. This makes C the "golden cut" of AB or line L .



The golden cut

If we segment each of the four sides of the rectangle of a video image according to the golden cut, and subsequently divide the rectangle with four lines running across to the section cuts on each side, we will have divided the video image as shown in the figure below. Our general rule of composition suggests that prominent features of the composition should be placed on one of these section lines, or on one of their four intersections. (Applying this rule to a 35mm frame results in section lines that divide the frame roughly into thirds. Hence the compositional rule known as the “Rule of Thirds”).



Section lines for both horizontal and vertical axes for a 4:3 video aspect ratio

By this method it would be incorrect, save for an extreme close-up, to put the teacher in the middle of the frame; he or she should be placed slightly to the left or the right. When the teacher is writing on the chalkboard, it would be best to balance the teacher, on one side, and his or her writing on the other. Which side the teacher is placed on depends on his or her orientation. For example, should the vector of the teacher’s gaze go off screen right, placing the teacher on the section line screen left would balance the weight of his or her gaze. In more complicated situations where there are more than two things in the frame, or a split of two items, it is still preferable to balance everything in the frame around the section lines, distributing the visual “weight” of the picture elements in relation to the section lines.

A Technical Note about Composition

Be careful not to be too tight with your framing. Use the safe line inside the camera viewfinder to ensure that relevant information will be seen on the edges. Compose your image within the safe lines. Remember that you are looking at a small camera monitor and the image will be displayed larger. Of course, vertical and horizontal lines in the image should be parallel with the edges of the frame.

3.2 Camera Moves

If the camera moves or zooms smoothly, infrequently and in reaction to events in the classroom, it will not draw attention to itself. If, however, it is moving constantly, zooming in and out, re-framing, and focusing, the viewer will be distracted and the camera work could conceivably interfere with the evaluation of

the data. This is another reason why we have opted for a master shot as the preferred shot. If the lens is zoomed out as wide as possible, camera movement will be minimized, the increased depth of field will keep the image in focus, and less camera panning and tilting is necessary to cover events in the classroom. Conversely, if the lens is zoomed in close, the camera must move constantly to keep a moving subject in the frame; thus, focusing will become more difficult. Below we will briefly discuss some guidelines to follow for achieving camerawork that does not call attention to itself.

Achieving Smooth Camera Movement

In order to achieve smooth camera movement panning, tilting and zooming must be carried out in a coordinated and integrated way rather than as three separate moves. As you zoom out, you must tilt down to retain the same framing. As you zoom in, you must tilt up. In addition, some shots require simultaneous zooming, panning and tilting. For example, a common shot will be to zoom out from a medium shot of the teacher at the chalkboard to a master shot of the teacher and classroom. In this maneuver, you must zoom out, pan (say) right, toward the students, keeping the teacher at the left edge of the frame, while you simultaneously tilt down, keeping the image exquisitely composed throughout.

Wide angle panned images cause less apparent camera motion than zoomed in pans. Fortunately, since our preferred shot is the MOS, you will often already be at a wider focal length when doing a pan. However, if for example you are zoomed on the chalkboard and need to pan over to a student in the back of the room, you should zoom out before panning to make the move less distracting.

Also, slower zooms are less distracting and are more desirable than fast ones. The EVW 300 has a variable speed automatic zoom. We suggest you always zoom with the automatic feature located on top of the right hand grip. The harder you press the zoom button, the faster it will move; the lighter your touch, the slower it will move. If you must make a quick close-up, or quickly zoom out to show something happening in the wider field, you should zoom at full speed so as to avoid missing the event you are trying to record.

Keeping Objects in Focus

It is extremely distracting to the viewer if the objects being taped are out of focus or if blatant readjusting of the focus takes place. In order to avoid this, you can define a field of focus by zooming in and focusing on an object or wall that you wish to be at the far edge of that field. As you zoom out, the increased depth of field from shorter focal lengths will keep your image focused. After this initial zoom in, there will be no need to refocus unless you zoom in on a plane other than your initial point of focus. Remember longer focal lengths have inherently less depth of field.

Chapter Four: Equipment

4.1 Camcorder

Canon Optura Digital Camcorder

The Canon Optura is a small, high quality digital camcorder using the mini DV format. It was chosen because of its lightweight, its image quality (500 lines in NTSC) and its ability to progressive scan. However, because the Optura is a consumer camera there are some restrictions that we have had to overcome using separate hardware. These are covered under "Microphones and Audio Connections". (See Section 4.2) Please read the Optura instruction manual thoroughly to become familiar with the camera and its functions.

Video Color Systems

There are currently three analog video systems in the world. NTSC, PAL, and SECAM. The United States, Canada, Japan, and a few other countries use NTSC. Europe and the rest of the world use PAL. France invented SECAM and it is used there although France also uses PAL. Because our video data will be digitized onto CD-ROM in Los Angeles, we use NTSC video. NTSC scans at 30 frames per second and uses a different color system than PAL and SECAM (PAL scans at 25 frames per second and uses 50 cycles per second AC power). All of our videographers will shoot with NTSC cameras regardless of their location.

Proscan

The Optura offers a progressive scanning CCD chip. This chip scans every line each 1/60th of a second. In effect it delivers 60 frames per second rather than the 30 frames per second and 60 fields (1/2 frame) per second of an interlaced scan. With this chip we have the option of recording video either as an interlaced signal or a progressive scanned signal. Since our final product is destined to be displayed on a progressive scanning computer monitor, progressive scanning will give us a sharper image (particularly when we sample stills from our video data). See page 33 of the Optura manual.

Note: Because the monitor mounted on top of the Optura is an interlaced video monitor, moving images on this monitor may appear "jerky" when the camera is set to progressive scan.

Video Recording and Still Image Recording

The Optura can be used as a digital still camera. The recording button is located on the upper right hand corner of the camera. Around this red button is a switch that can be turned to "Movie", "Photo" or "Lock". When set to "Movie", the camera records video when the red button is pressed. When set to "Lock", the camera is in standby mode. When set to "Photo", the camera will take single frame digital stills. (See page 12 of the Optura manual).

Be sure you have set this switch to "Movie" mode so that the camera will record video and not stills.

Camera Video Exposure

The Optura has good automatic exposure as well as an automatic video gain switch that works together with the auto exposure. We recommend that you use an automatic exposure mode. The automatic settings are located on "program selector" (the large knob on the left side of the camera). For automatic exposure AND progressive scanning, you must NOT use the "Easy Recording" program. Use the auto recording program "A" in the US, Japan, and NTSC countries. In Europe, Hong Kong, and PAL countries use the "Tv" program mode (shutter priority).

In 95% of our applications these automatic settings will make proper exposures. The major exception is a wide shot in a dark room with a bright projected image (slides, opaque projector, film, etc.). In this case we recommend that you zoom into a close-up of the projected image (so that the auto exposure can adjust to the correct exposure for the projected image) or retain a wide shot and push (once) the exposure wheel. Next, turn the exposure wheel manually to adjust exposure for the projected image by turning the exposure knob. To return to auto exposure, push the exposure knob again.

In Europe, Hong Kong and other PAL countries you must use the "Tv" automatic setting and pre-set the shutter speed to 100 by turning the exposure wheel. If the exposure wheel is pushed in once, the aperture can be set manually while retaining the shutter speed of 100. Push the exposure wheel again to return to automatic aperture exposure while retaining the pre-set shutter speed. Please see the section on the next page.

We suggest that you set up both cameras with the classroom windows behind them. This will avoid backlit subjects that can cause trouble with the automatic exposure control. If this is not possible and you have backlit subjects you will have to set the exposure to manual and to adjust it during recording. Backlit subjects (even if properly exposed) are undesirable because we cannot see everything in the foreground and background.

NOTE: Relying on the small, low resolution LCD monitor for exposure is not desirable and should be done so only if necessary.

Camera Focus

The Optura has good auto focus. We recommend that you use it most of the time. However, it does not "know" what you are aiming at. It is also slow to react in certain situations. There will be rare situations when the auto focus will not focus on what you want and you will have to adjust the focus manually. (Low light and low contrast situations can especially cause problems with auto focus). The focus wheel is located on the lower left side of the camera (next to the exposure wheel). Like the exposure wheel, it will shift into manual focus when pushed once. You

can control the focus manually by turning the focusing wheel up or down. Press again to return to auto focus.

Shutter Speed

NTSC Video is scanned at 30 frames per second. This is compatible with the frequency of alternating current in the United States (60 cycles per second). However, when an NTSC camera shoots under artificial light in a PAL country (with alternating current at 50 cycles per second), the image flickers. This is caused by the frequency difference between the scan rate of the camera and the frequency of the lights (ac current). This flicker can be corrected if the camera's shutter (which opens and closes before the scanning chip) is set to a multiple of 50. We recommend that you use a shutter speed of 100 in PAL countries. This means that in PAL countries, you must set the automatic program mode to "Tv" rather than "A". When in the "Tv" mode, adjust the shutter with the Av/Tv control wheel (the exposure wheel). As mentioned above, you can push the exposure wheel once and manually adjust the aperture while retaining a shutter speed of 100. (See page 37 of Optura manual).

In the United States and Japan (NTSC countries), shutter speed is not an issue. We recommend you use the "A" auto exposure program. The shutter speed and aperture will be set automatically. See page 36 of Optura manual.

Optical Image Stabilizer

The Optura is a small camera and it is virtually impossible to hold it steady particularly when the lens is zoomed in. It has a very good optical image stabilizer that will take the shake out of most movement. Keep the image stabilizer set to ON. However, it is still necessary that you handle the camera as smoothly as possible especially when it is off the tripod.

Camera Menu Settings

The camera has a programmable menu for various functions. There are two main menus. Set them as shown below: You may need to use the camera's remote control to set some of these functions. (See page 25 of the Optura manual.)

Camera Menu: Set the power switch to Camera and the standby lever to "Movie". Press the "Menu" button.

Digital zoom: ON

Wind screen: OFF

White Balance: AUTO

16:9 : OFF

Movie Mode: Pro Scan

Sensor: ON

Tally: ON

Audio Mode: 16 BIT

Record Mode: SP

Date/time set: Set Date and time

VCR Menu: Set the power switch to VCR. Press the "Menu" button.

Tally Lamp: ON

Sensor: ON

Rec Mode: SP

Mix Select: FIXED

Data Code: CAM

Volume: Medium

Date/time set: Set date and time

Camera Cleaning

It is important to keep the cameras clean on the inside and out. A can of Dust Off and an anti-static cloth are provided to keep the outside clean. Lens tissue is also provided. Breathe on the lens to create a small amount of moisture and clean the lens with one flat piece of lens tissue. Clean the lenses on both cameras before every taping.

Clean each camera's video heads every month using the head-cleaning cassette provided. Insert the cleaning cassette into the camera and press play for 10 seconds. Eject the cassette.

Humidity and Condensation

If the camera is moved from a cold place to a warm place condensation may form on the video heads and other camcorder parts. This can cause damage to the tape and the camera. This is especially true in hot humid climates where air-conditioning is used (in Hong Kong, for instance). But it can also happen if it is cold outside and the camera is brought into a heated building.

IF CONDENSATION IS LIKELY TO BE A PROBLEM, unload the cassette and put the camera in a plastic bag. When the camera reaches room temperature, remove it from the bag. A warning sign will appear in the viewfinder of the camera when condensation is detected and the camera will not operate. You cannot load a cassette when condensation is detected. See page 61 of the Optura manual.

4.2 Microphones

The only audio source for the student camera is the ZM-100 zoom microphone. Mount this microphone on top of the camera and plug it into the camera. The teacher camera needs both the teacher's wireless microphone and Sennheiser

ME-6 shotgun microphone mounted on top of the camera. Both these sources are mixed and balanced via the XLR Pro mixer mounted at the bottom of the teacher camera. Plug the output of the wireless receiver (XLR male) into the SOURCE 1 XLR (female) input of the mixer. Plug the Sennheiser ME-6 cable into the SOURCE 2 input of the mixer.

Source 1: Teacher's microphone (wireless receiver output)

Source 2: Student's microphone (Sennheiser ME-6 shotgun mounted on camera)

Studio Pro XLR Mixer

The mixer is mounted between the camera and the tripod. Mounted below the mixer should be the tripod's quick release plate. The mixer allows two separate grounded audio sources to be mixed through the (mini) stereo input on small camcorders.

Plug the cable from the Sennheiser ME-6 into SOURCE 2 (XLR jack) of the mixer. Plug the XLR cable from the Lectrosonics radio receiver into SOURCE 1 (XLR jack) on the mixer. Plug the output cable of mixer into Mic In plug on teacher camera.

Select "Stereo" from the switch on the front of the mixer. Listening via headphones, switch the ground switch to the best position so there is no hum. Switch both Source 1 and 2 switches to the "mic" (up) position. Finally, adjust the volume of each microphone source on the mixer. SOURCE 1's volume (the wireless teacher's mic) should be set at either 3 or 4. SOURCE 2's volume (the Sennheiser ME-6) should be set at ten. You should hear the teacher's mic coming through one ear of the headphones, and the camera mic coming through the other ear of the headphones. (Remember, the camera mounted mic will pick up any sounds you make).

In field tests a volume level of 3 or 4 for the teacher's mic (SOURCE 1) and 10 for the students' mic (SOURCE 2) seemed right. This will vary depending on the size of the classroom and the teacher's voice.

Note: The instructions for the XLR mixer state the following:

"If you are using two mics and your camera has AGC (Automatic Gain Control) for the audio levels, whichever mic is the loudest will end up setting the level. Use the audio level controls to turn down the loudest mic to match the audio level to the weaker mic."

In other words, if the teacher talks very loudly, this will affect the automatic audio gain on the Optura, bringing the level of both audio channels down which can make the level for the zoom (student's) microphone too low. Should this appear to be the case, you can adjust the volume control for the teacher's mic on the mixer LOWER than 4. This will have the effect of adjusting the zoom mic level higher.

Volume Settings/Ratio on Mixer:

Teacher Mic/Source 1: 3 or 4

Student Mic/Source 2: 10

Lectrosonics Wireless Radio Microphone

There are three parts to this microphone: a transmitter (M187), a lavalier microphone (M150) that plugs into the transmitter (M187) and a receiver (CR 175).

Lavalier Microphone:

Plug this into the transmitter. Be sure that the connector locks in. (Disconnect the lavalier and store it in the case when it is not in use.)

The Transmitter:

Insert a new 9v battery BEFORE each taping. The transmitter has an on/off switch. Be sure to switch it on when it is in use. The power on/off LED should glow brightly.

Turn the power switch to the MUTE position on transmitter. Position the microphone to the appropriate location on the teacher. Keeping the power switch to MUTE ask the teacher to speak as he or she normally would in front of a class. Rotate the MIC LEVEL so that the LEVEL LED flickers or stays lit as you speak. The LIMIT LED should light up on loud peaks. Occasional lighting of the LIMIT LED indicates proper operation and optimum signal-to-noise ratio. Even when limiting is occurring, little or no distortion will occur.

(Be sure to set the transmitter mic levels BEFORE you go to the school. When you wire the teacher with the microphone, do a quick test to see that the levels are set correctly for the location. If the mic level is too high, the LIMIT LED will light frequently or stay lit. If this occurs, lower the mic level. If the mic level is too low, neither LED will light or the LEVEL LED will light dimly. This condition may cause noise in the signal.)

Do not forget to move the power switch to ON when you are ready to tape. Please refer to the Lectrosonics M187 transmitter instructions. Information about this system can also be seen on the internet at www.lectro.com.

The Receiver:

Insert a new 9v battery BEFORE each taping. The receiver has an antenna which must be attached for reception. Before proceeding, make sure the antenna is locked in place. Turn the receiver ON and check to see that the red POWER LED lights up.

Set the OUTPUT control to the 2 o'clock position or 3/4 full. If you hear distortion from the microphone, adjust the OUTPUT control to the left. If you hear a hiss coming from the microphone adjust the OUTPUT control to the right. (Be sure to test and adjust the receiver output BEFORE you go to school. Check the LED levels on location to insure they are set optimally.)

Radio Frequency on Receiver:

This LED lights up when the transmitter is turned on and working properly. Make sure this green light is on.

Power:

This LED lights up when the receiver is properly connected to a power supply and switched on. It indicates proper voltage when the receiver is using a battery.

Modulation:

The “-20” LED lights up when the audio signal from the transmitter is present at an adequate level to produce a good signal to noise ratio. The “0db” LED lights when the audio level is high and the signal is being compressed in the transmitter. It is normal to see an occasional flick of the 0db lamp. An extremely high audio level may cause distortion.

Plug the line out of the receiver into XLR SOURCE 1 of the mixer using the six foot XLR male to XLR female cable provided. Please refer to the Lectrosonics receiver instructions. Information about this system can also be seen on the internet at www.lectro.com.

Frequencies:

The radio frequency of the Lectrosonics microphone is set at the factory and cannot be adjusted. Be sure that the frequency of your transmitter (written on the transmitter) is legal for the country you are operating in. Be sure to communicate with us as to whether your transmitter has the proper frequency.

Canon ZM-100 Zoom Microphone

This microphone is for the student camera. Mount the ZM-100 on the “shoe” on top of the student camera. Plug both microphone cables into the student camera. The audio plug (with two black stripes on the plug) plugs into the “mic in” jack. The microphone needs no battery as it gets its power from the camcorder. The power plug (with one black stripe) plugs into the “DC” jack (next to the mic in jack). Set the ZM-100 stereo/zoom switch to “ZOOM.” DO NOT USE “STEREO.” Set the zoom knob to 90 degrees.

Sennheiser ME-6 Shotgun Microphone

The ME-6 comes in two parts; the microphone capsule and the power supply module. The microphone capsule screws into the power supply. You should have received this microphone with both parts screwed together. You must unscrew the capsule in order to change the microphone’s AA battery. Be sure to insert a fresh AA battery into this microphone before every taping. When you turn the microphone ON, the LED light should blink once if the battery is good.

This microphone inserts into its “shock mount” and the mount attaches to the “shoe” on top of the teacher camera. The one foot microphone cable provided

plugs into the microphone at one end and into SOURCE 2 of the XLR pro mixer at the other end.

Adjust the shotgun so that it points at about a 30 degree angle toward the students in the classroom. This mic should favor the students over the teacher.

Bass Roll Off Switch

Located in front of the on/off switch is the bass roll off switch. It has two settings represented by a flat line and a curved line. If set to the bass roll off position (curved line) the microphone will minimize the gain on lower (bass) frequencies. If set to the normal position (flat line) the microphone will deliver all frequencies evenly (20-20,000 Hz at 0 dB). In the classroom you will not ordinarily encounter loud bass frequencies. Accordingly, set this switch to the flat line position.

4.3 Digital Watch

Use this watch to record time on both cameras just prior to taping a lesson. This time reference will aid in synchronizing both cameras in playback. Try to get the largest image of the watch as possible in the viewfinder. It may help to angle the watch so that light will better illuminate the time.

4.4 Tripods

You are provided two tripods. Use the Matthews fluid head tripod with the teacher's camera and the Pro Master non-fluid head tripod with the student's camera. After it is set, the student's camera does not need to be moved and therefore does not need the smoother fluid head tripod. The Pro Master tripod extends higher than the fluid head tripod. Be sure to extend this tripod to its maximum height after attaching the student camera.

4.5 Power/Batteries

Whenever possible, the student camera should be powered by AC current. Insert the "fake" battery (DC-900 DC adapter) into the Optura's battery compartment and connect its cable to the ac adapter/battery charger. Plug this unit into the wall. We have provided a 15 foot extension cord as well as current and plug adapters for your location. The NTSC Optura runs on 110 volts/60 cycles ac power.

Because the teacher camera must be able to move around the classroom it must be battery powered. Provided are two large Bescor 3 hour batteries. Insert the "fake" battery (DC-900 DC adapter) into the Optura's battery compartment and connect its cable to the plug on top of the large Bescor battery. These batteries do not have "memory" and should be charge every night before a taping.

4.6 Videographer's Vest

The vest is provided to give you a place to carry the battery and the wireless microphone receiver. From the vest pockets will come cables attaching these things to the camera. We suggest you also carry the second Bescor battery and an additional mini DV videotape in the vest pockets in case a battery or tape runs out before the lesson is over.

Chapter Five: Checklist

5.1 Regular Maintenance

- ❑ Read the Canon Optura instruction manual thoroughly.
- ❑ Read the microphone and mixer instructions thoroughly.
- ❑ Set date and time on both cameras. See page 29 of Optura manual.
- ❑ Clean cameras and camera lenses regularly.
- ❑ Clean video heads every month with cleaning cassette.
- ❑ Change camera's CR2025 Lithium battery if its icon flashes in the monitor display. It should last one year. See page 56 of the Optura manual.

5.2 Before you go to the School

- ❑ Make sure both Bescor batteries and the small Canon battery (BP-914) are charged.
- ❑ Put fresh 9v battery in wireless mic transmitter.
- ❑ Put fresh 9v battery in wireless mic receiver.
- ❑ Put a fresh AA battery in the Sennheiser ME-6 Shotgun.
- ❑ Insert "fake" batteries (DC-900 DC adapter) into both cameras for later connections to ac adapter or the large batteries.
- ❑ Review and pack directions for school.
- ❑ Label tapes now if you wish. (Be sure not to use the wrong tape if a class is canceled.)

On each camera:

- ❑ Set camera program mode: "A" Auto. (NTSC Countries)
- ❑ Set camera program mode: "Tv" and set shutter speed to 100 (PAL countries) (See page 46 in Optura manual.)
- ❑ Set Image Stabilizer to "ON" (See page 24 in Optura manual.)
- ❑ Set record button switch to "MOVIE"
- ❑ Set monitor switch to "EXTERNAL"

On camera menu settings:

(See page 25 of the Optura manual.)

- Digital zoom: ON
- Wind screen: OFF
- White Balance: AUTO
- 16:9 effect: OFF
- Movie Mode: ProScan
- Remote sensor: ON
- Tally lamp: ON
- Audio mode: 16 BIT
- Record mode: SP
- Data /time set: Set Date and time

On VCR Menu Settings:

- Tally lamp: ON
- Sensor: ON
- Rec Mode: SP
- Mix Select: FIXED
- Volume: OFF
- Record Mode: SP
- Data Code: CAM
- Date/time set: Set Date and time

Mixer and Stereo microphone:

- Set switches and controls on mixer and zm-100 in proper position.
- Line/mic: MIC
- Stereo/Mono: STEREO

Other:

- Pack equipment using checklist "equipment to take to school".
- Pack material packets (copies of questionnaires and return envelope) for teachers.

5.3 Equipment to Take to School

Video camera hard case

- 1 Canon Optura "Teacher" Camcorder
- 1 Sennheiser ME-6 Microphone

- 1 Shockmount for Sennheiser Microphone
- 1 Canon Optura "Student" Camcorder
- 1 Canon ZM-100 zoom mic
- 1 Studio Pro XLR Mixer
- 1 Lectrosonic transmitter M187
- 1 Lectrosonic receiver CR175 with antenna
- 1 Lavalier Mic M150
- 1 extra tie clip for lavalier
- 1 Sound Isolating stereo headphones
- 1 foot XLR to XLR microphone cable for Sennheiser microphone
- 1 6 foot XLR male-XLR female shielded audio cable (for use between Lectrosonics receiver and XLR mixer)
- 2 9v batteries for wireless mic system
- 4 Blank Mini DV tapes (Videographer should always have 4 extra tapes)
- 1 AA battery for Sennheiser microphone

Gadget bag/ Tamrac 787

- 1 Canon WL-D66 camera wireless remote
- 1 STV-250 stereo video cable
- 1 A/C adapters for camcorders (CA-900)
- 2 "fake" batteries (DC-900 DC adapter)
- 2 small Canon camera batteries (BP-914)
- 6 9v batteries for Lectrosonic receiver and transmitter (2 installed in case)
- 4 AA Batteries for Sennheiser microphone and WL-D66 wireless remote
- 2 Bescor batteries (use the DC-900 DC adapter with these batteries)
- 2 Bescor battery rechargers
- 1 15' extension cord
- 4 Packs of lens tissue
- 1 Can Dust Off
- 1 Anti-static cloth
- 1 Masking tape
- 1 Current converter and/or adapter (US excluded)

- 1 Roll gaffer's tape
- 2 Canon video/audio proprietary cables for Optura (supplied with camera)
- 1 Data Collection Manual, Optura camera instruction manual, transmitter/receiver instruction manual, and zoom mic instruction manual
- 2 Cleaning cassettes for mini DV
- 1 Digital wristwatch (to be used as stopwatch)
- 1 Tamrac photographer's vest
- 4 Blank DV tapes
- 1 Tamrac photographer's vest

Tripods

- 1 Matthews THM-20 fluid head tripod (teacher camera)
- 1 ProMaster 6400 Photography tripod (student camera)
(extend this as high as possible)
- 1 Padded Tripod Case

5.4 In the Classroom

- ❑ Put ID Labels on video tapes if you have not already done this.
- ❑ Load video tapes into cameras if you have not already done this.
- ❑ Ask the teacher about the lesson.
- ❑ Choose camera positions.
- ❑ Move student desks if necessary.
- ❑ Close blinds if necessary.
- ❑ Set up student camera on Pro Master tripod.
 - Remove lens caps.
 - Set VCR switch to camera/record.
 - Mount zoom microphone on camera.
 - Plug zoom mic into camera.
 - Connect ac adapter or Bescor battery to the camera.
 - Set microphone zoom knob to zoom.

- Turn camera on.
- Check audio with headphones.
- Set up teachers camera on Matthews fluid head tripod
 - Remove lens caps.
 - Connect Bescor battery to camera using the cable from the “fake” battery DC-900 DC adapter.
 - Insert Sennheiser microphone into the shock mount.
 - Mount Sennheiser microphone on camera.
 - Turn the Sennheiser microphone ON.
 - Plug the Sennheiser microphone audio cable into mixer CHANNEL 2.
 - Turn Camera ON. (Set the VCR switch to camera/record)
 - Set the mixer stereo/mono switch on mixer to STEREO.
 - Set the mixer line/mic switches on both channels to MIC.
 - Set Channel 1 (Teachers) volume to 3 or 4.
 - Set Channel 2 (Zoom mic) volume to 10.
 - Plug output cable of mixer into camera’s “MIC IN” plug.
 - Attach antenna to wireless receiver.
 - Plug Lavalier mic into transmitter and turn the transmitter to MUTE.
 - Wire the Teacher with the microphone and transmitter and ask for a voice test.
 - Monitor the MIC LEVEL LED on transmitter.
 - Turn the transmitter ON.
 - Plug wireless receiver into mixer CHANNEL 1 using XLR cable.
 - Turn wireless receiver ON.
 - Turn Teacher’s Camera ON.
 - Plug headphones into camera’s headphone jack.
 - Monitor audio levels from both microphone on teacher camera.
 - If there is audio hum check ground switch on mixer.
 - Temporarily disconnect battery and receiver cables from the teacher’s camera.

- Start Student Camera and make a close-up of the digital watch.
 - Reconnect the battery and receiver cables to the teacher camera.
 - Check that you can remove the camera from the tripod and move about freely.
- Record lesson

5.4 After Taping the Lesson

- Remove the teacher's microphone and transmitter
- Turn off transmitter and receiver
- If there is video tape time remaining, collect supplementary video documentation (allow pan of classroom, close-ups of manipulatives, etc.)
- Rewind and remove tapes
- Make sure bar code labels are on all tapes
- Lock record tab on tapes
- Give teacher the questionnaire packet
- Pack equipment using checklist "equipment to take to school"
- Complete log sheet and affix ID label to it

APPENDIX 1: TIMSS-R Video Study Data Collection Procedures for Videographers

1. Materials provided to videographers before the shooting

Before going to the school to collect data, videographers will be provided with the following two kinds of materials: (1) lesson information and (2) a material packet.

1.1 Lesson information

A document describing where each lesson is to be videotaped will be mailed/faxed to videographers as soon as the lessons are scheduled with the school and teacher. The information will include:

- School name and location
- Contact person and phone number
- Teacher name
- Time, date, and location of lesson to be taped

1.2 A material packet

The videographer will be shipped a supply of packets which will be used for each classroom taping session. Each packet contains materials for either a math or a science lesson. They have **not** yet been assigned to a particular school. Each packet includes:

- 1 teacher questionnaire with a bar-code label attached
- 1 set of student questionnaires each with a bar-code label
- 1 teacher instruction sheet
- 1 materials list included and returned by teacher
- 1 sheet of bar code labels for teacher to attach to additional materials being used during the lesson
- 1 sheet of bar code labels to be attached by the videographer to the videotapes and additional classroom materials after the videotaping

- 1 log sheet with a bar code label attached
- 1 FAX sheet for videographer to send tracking information
- Three FedEx pouches and air bills (two for the teacher; one for the videographer)

2. Procedures for collecting data

Once videographers receive the above items, they can go to the schools and collect the data. The data collection procedures for videographers to follow are listed below.

2.1 Before going to the school

- Verify that you have the correct type of packet.
- If you are taping a math lesson, you should have a math packet.
- If you are taping a science lesson, you should have a science packet.
- Include the packet with all the other necessary video equipment.

2.2 After taping the lesson

- Remove the teacher's materials from the packet and instruct the teacher on what to do with them.
- Attach bar code labels to the tapes and to any additional classroom materials handed to you by the teacher.
- Fill out the log sheet and attach a bar code label to the log sheet.
- Send the tapes and the log sheet back to LessonLab. We strongly encourage you to use Federal Express. If you travel to an area that does not have Federal Express, we suggest you wait until reaching one of their branches at a large city.
- After materials have been shipped, send a completed FAX sheet to LessonLab including the tracking number and a description of the materials. If a FAX is not available, please phone in this information.

APPENDIX 2:



TIMSS-R Video Study

Videographer's Class Log Sheet

BAR CODE

- ☐ CAMERA OPERATOR: _____
- ☐ SCHOOL NAME: _____
- ☐ LESSON: MATH _____ SCIENCE _____
- ☐ DATE & TIME OF LESSON: _____

• MATERIALS COLLECTED AND RETURNED WITH THIS LOG SHEET

	TYPE:	QUANTITY
<input type="checkbox"/>	Videotapes	_____
<input type="checkbox"/>	Copies of Textbook pages	_____
<input type="checkbox"/>	Copies of Workbook pages	_____
<input type="checkbox"/>	Overhead Projections	_____
<input type="checkbox"/>	Handouts	_____
<input type="checkbox"/>	Other	_____

• WERE THERE ANY PROBLEMS ENCOUNTERED DURING VIDEOTAPING?

• ANY OTHER COMMENTS THAT MIGHT BE USEFUL FOR UNDERSTANDING THE VIDEOTAPE?

APPENDIX 3:


TIMSS-R Video Study

Instructions for teachers

In order for us to have a more accurate understanding of the lesson just videotaped, it would be helpful if you could provide copies of written documents such as handouts, lesson plans, tests, quizzes, etc.

Please follow the instructions for each item listed below and fill out the second page of this form. Send the form, and all items that apply, back to us in the pre-addressed, pre-paid envelopes. Please affix an ID label to each of these documents.

If you will not have a lesson or unit assessment ready until later, send the rest of the items **NOW** in the first envelope, and send the assessment later in the second envelope.

Your payment will be processed upon receipt of the materials.

- | | |
|--|--|
| <input type="checkbox"/> Teacher questionnaire | Please fill out this questionnaire as soon as possible after the videotaping is completed – preferably on the same day as the videotaping- and send to LessonLab. |
| <input type="checkbox"/> Student questionnaire | Please ask each student to fill out a questionnaire and collect them as soon as possible. |
| <input type="checkbox"/> Additional materials | Please include a copy of every written document used during the lesson (e.g., worksheets, copy of textbook pages, overhead transparencies). |
| <input type="checkbox"/> Lesson plan or notes | Please include a copy of your lesson plan or notes for the videotaped lesson if available. |
| <input type="checkbox"/> Lesson or unit assessment | Please include a copy of your lesson or unit assessment (e.g., test, quiz, report or portfolio guidelines) with your questionnaire. |

Thank you very much for your cooperation and thoughtfulness!

APPENDIX 4: Additional Material List

BAR CODE

- MATERIALS INCLUDED AND RETURNED WITH THIS SHEET

	ITEM	QUANTITY	PAGES
<input type="checkbox"/>	Teacher questionnaire	_____	
<input type="checkbox"/>	Student questionnaires	_____	
<input type="checkbox"/>	Handouts	_____	
<input type="checkbox"/>	Copies of overhead projections	_____	
<input type="checkbox"/>	Copies of Textbook pages	_____	_____
<input type="checkbox"/>	Copies of workbook pages	_____	_____
<input type="checkbox"/>	Copies of pages from other books	_____	_____
<input type="checkbox"/>	Copies of your lesson plan	_____	
<input type="checkbox"/>	Copies of lesson assessment	_____	
<input type="checkbox"/>	Copies of unit assessment	_____	
<input type="checkbox"/>	Other	_____	

APPENDIX 5:

INSTRUCTIONS FOR SHIPPING VIDEO TAPES TO THE UNITED STATES

Video/Film Declaration

Federal Express will most likely require additional information before shipping film and video tapes to the United States. You may be asked to complete one of the following forms: Commercial Invoice, a Proforma Invoice and/or a Certificate in Connection with the Importation of Film and Videos. These forms may be different in your country. You may decide to fill out these forms and then make copies.

You will be asked to provide, in English, a full description of the video tapes including:

Title

Length (time duration)

Size (physical dimension)

Weight

Value

Brief summary of the contents

Reason for importation

For more information contact your local Federal Express office:

Netherlands 0 800 022 2333

Czech Republic 32 2 752 7557

Switzerland	0 800 553 757
Germany	0 800 123 0800
Japan	0 120 00 320 0
Australia	1 2 26 10