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AUTHOR Collins, Angelo
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ABSTRACT

Unit plans presented by 18 high school biology teachers as part of portfolios designed to represent their work were compared. Portfolios are increasingly being considered in the assessment of master teachers, beginning teachers, and preservice teacher candidates. The research staff of the Stanford University Teacher Assessment Project designed a portfolio development process and guided/assisted the participants as they developed their portfolios. The 18 teachers were chosen to represent diversity in experience and work conditions among biology teachers. The unit plan, one element of the total portfolio, was rated by 16 raters from the research team and the teaching profession. Teachers who developed acceptable plans had a minimum of three types of evidence: (1) the instructional sequence; (2) justification for inclusion of the topic in the syllabus; and (3) a reasoned or descriptive reflection about the successes and failures of the unit. The difference between acceptable and unacceptable plans was in the ability to reflect on the plan and its execution. The review made it clear that teachers can organize evidence of their skills, knowledge, and dispositions around a unit plan, and that raters can make judgments based on these plans. Five tables present information about the subjects. An appendix contains the biology teacher's portfolio construction kit. (SLD)

A Teacher's Portfolio -- What is Necessary and Sufficient?

(A High School Biology Unit Plan as an Example)

Angelo Collins

Stanford University

Paper Based on a Presentation at the

Annual Meeting of the

American Educational Research Association

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Running Head: Unit Plan

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For further information on the Teacher Assessment Project write: Teacher Assessment Project, CERAS 507, Stanford University, Stanford, CA 94305-3084

A Teacher's Portfolio - What is Necessary and Sufficient?

(A High School Biology Unit Plan as an Example)

Since 1986 the Teacher Assessment Project (TAP) at Stanford University has been exploring alternative modes of teacher assessment. Among the assumptions of the Project have been that: 1) teaching is a complex task and therefore the assessment of teachers will require a battery of modes of assessment, some of which will be as complex as teaching itself; 2) teaching takes place in a context of teaching some subject matter to someone at some time; 3) professional teachers have both theoretical knowledge and practical skill in teaching; and 4) the procedures for the assessment of teachers should be by and for teachers themselves. During the academic year 1988-89, seventeen high school biology teachers from the San Francisco Bay Area and one high school biology teacher from Arizona participated in the research of TAP by developing portfolios as a mode of assessing their knowledge, skills, and dispositions.

Portfolios for the assessment of teachers seem to be an idea whose time has come. Seldom mentioned a few years ago, portfolios are now being considered for the assessment of master teachers, beginning teachers, and pre-service candidates for teaching. But what exactly is a schoolteacher's portfolio and what function might it serve? A portfolio is a container that holds a collection of documents. These documents provide evidence of some knowledge, skill and/or disposition. Bird (1989) has presented several images of a teacher's portfolios by looking at portfolios in other professions: the portfolio of an artist or architect shows selected, best work; the log of a pilot or investment broker shows all work in progress; a salesperson's catalogue shows the ability to deliver someone else's work; and the badges of a boy/girl scout show work completed with the aid of a mentor. To these images of portfolio must be added the tenure file of a university professor which shows various types of work -- some in progress and some completed, best work -- and the dissertation of a doctoral candidate which shows work done with advice but defended as one's own.

The purpose of this paper is to describe and compare the evidence presented by eighteen high school biology teachers in one entry of a teacher's portfolio -- the unit plan. Based on this description and comparison, the following questions will be addressed: What are the similarities and differences in the amount, form and quality of evidence presented in the portfolio of a teacher given a high rating and a teacher given a low rating? What evidence is necessary in a teacher's portfolio in order to make judgements about the quality of the teaching? What is sufficient evidence? What are the similarities and differences in evidence between a beginning teacher and an experienced teacher?

The Study

Because of the assumption that the assessment of teachers must be by and for teachers, the research staff of BioTAP (the biology component of the Teacher Assessment Project) consisted of the project director, who has 15 years of high school biology teaching experience as well as an advanced degree in curriculum and instruction, four Stanford research assistants, three of whom have high school biology teaching experience, and four high school biology teachers. The high school teachers on the research team were selected based on recommendations from local supervisors, an interview and at least two observations of their teaching. This research team was responsible for designing the directions for the portfolio development process, guiding and assisting the teacher participants as they developed their portfolios, and designing and implementing a rating system for portfolios. The eighteen teachers who agreed to completed portfolios as participants in the study were not a random selection of high school biology teachers. They represented an attempt to capture diversity among biology teachers. An intern was the least experienced in the group; the teacher with the most experience had been in the classroom for twenty-nine years. There were an equal number of men and women. The teachers represented diverse school and classroom contexts -- large and small schools, classes with a single ethnic group and classes with mixed ethnicity, and accelerated, standard and remedial biology classes.

The portfolios that the teachers developed had six entries: 1) a professional biography, 2) unit planning, 3) instruction, 4) assessment of students, 5) school and community relations, and 6) an optional, open, unstructured entry. An entry was defined as a section of a portfolio that represented a critical task of teaching. This paper only presents data on the entry on the unit plan. Planning a unit was identified by the research staff as a critical task of high school biology teachering and one that is probably important in other school disciplines and at other grade levels as well. It is a skill presented in almost all science methods textbooks and courses. Unit planning provides a teacher the opportunity to display subject matter knowledge in presenting a balance of instruction on the content of biology, the processes of science, and the human and social components of biology as well as the pedagogical knowledge of how to teach biology. The unit plan entry also provides a teacher an opportunity to display sensitivity to the interests and needs of students as well as the ability to deal with the realities of time, space, and resources. In this study, a unit was defined loosely as a sequence of instruction determined by some natural boundary such as a topic, a section in a textbook, or the calendar. The teachers selected the units on which to present evidence. They were instructed to present evidence on three aspects of planning: 1) a justification for teaching the unit, 2) the sequence of instruction, and 3) a reflection on the success or failure of the unit. Appendix A is the revised directions given to the teachers on how to develop the entry of the portfolio on unit planning (Collins, et al., 1989). Although recommendations were made about types of evidence that might convey their knowledge about planning, the teachers were free to select the form and style of the evidence.

When the portfolios and other assessment activities were completed in June, 1989, a rating team of sixteen persons rated each of the assessment activities. The rating team consisted of the members of the research team, a research biologist, two university faculty members in science education and four high school biology teachers in addition to the four on the research team. The raters used a holistic rating scheme based on five categories of teacher performance modified from the five core propositions of what a teacher should know and be able to do from the National Board of Professional Teaching Standards

(1989). These categories were that the teacher: 1) attended to students and their learning, 2) knew their subject matter and how to teach it, 3) attended to managing and monitoring the classroom, 4) thought about and learned from his/her activity, and 5) was a member of a learning community. In addition to these five ratings, each rater gave each teacher an overall goodness rating on each assessment activity. In order to be able to determine inter-rater reliability at a later date, each activity be each teacher was rated twice by different raters each time. The rating scale for each category and for overall goodness was from 1 to 5, with 5 being superb, 3 being acceptable, and 1 being unacceptable even for a novice teacher.

After the portfolios were completed and rated, each portfolio entry was read carefully, and the statements distributed to a matrix. The cells in the matrix contained an identification code for each candidate, the number of years of teaching experience, the average goodness score for all assessment activities, and the average goodness score for the unit planning portfolio entry. In addition, cells were designed to correspond to specific directions in the portfolio entry. These cells included: 1) the types of evidence included in the portfolio, 2) the justification statement, 3) the reflection statement, and 4) the instructional sequence. The instructional sequence section of the matrix had five divisions: 1) what students were expected to learn, 2) the balance of content, process, and social knowledge, 3) the relationship between the intended learning outcome and the instructional strategy, 4) the logic for the sequence of instruction, and 5) the anticipation of potential problems in teaching the unit. These categories in the matrix were dervied from research on planning (For example, Dannhausen, 1978), from standard science methods texts (For example, Trowbridge & Bybee, 1986), from research on science and science teaching (For example, Champagne, Lovitts, & Calinger, 1989), from the experiences of the research staff, and from the data itself. It is not meant to be a definitive list of characteristics of an excellent lesson plan, but a list of convenience.

Results

Table 1 presents the information that identifies the characteristics of the teachers in the study. It includes a number code which corresponds to the average overall goodness scores on all assessment activities, except for Teachers 16, 17, and 18. These three teachers did not complete all the assessment activities, and so no average overall goodness score was calculated for them. They did however, complete the entire unit planning portfolio entry. The second column is years of experience; Teacher 3 was an intern teacher at the time. The next two columns are the average goodness score for all assessment activities and the average goodness score for the unit planning entry. The next column defines the characteristic that emerged from the data as important in distinguishing the acceptability of the performance of the teachers on the unit planning portfolio entry. This characteristic is the type of statements that the teachers made in writing the reflective statement at the end of the portfolio entry. There were three distinct types of statements. One is coded as M, because the teacher did not include a reflective statement in the entry. The second type of statement is coded as D, because the reflective statement only contained descriptions of what happened. An example of a descriptive statement is: "The students were so busy doing the lab that they never found time to copy what was on the board." The final category of statements are coded R, because the teacher included at least one reason or pattern in the reflective statement. For example: "I know the students were bored, but I feel trapped between making the course interesting for them and the demands of the content. I can't seen to achieve both in the same lesson." For convenience, the titles of the units for each teacher are also included as the last column in Table 1.

Table 1 Here

Table 2 is a summary of two features that are important in differentiating the teachers' performances on the unit plan portfolio entry: years of experience and type of reflective statement.

Table 2 Here

Table 3 summarizes the teachers' years of experience, the score on the unit planning portfolio entry, the type of evidence that was in the portfolio entry and the level of organization. The types of evidence falls into four categories. One category was the statements of justification on teaching the unit and the reflection after the unit was completed. The evidence was considered present if there was as much as a phrase written about each of the the two events. However, essays of justification and reflection were as short as a phrase, as for Teacher 11 who wrote, "I usually teach it.", and as long as four pages, as for Teacher 2. The second category of evidence was some form of lesson plans. In some cases, the plan consisted of words written on a calendar, in others the plans for each day were a page long. The third category of evidence was resources. Some teachers included copies of the materials they gave to students, while others made a list. The last category of evidence was samples of student work. One teacher included in the reflective statement copies of students' comments while another included photos of students doing a laboratory activity. There were also different levels of organization that the teachers used to present their evidence. These levels of organization are coded in Table 3 as High, Medium and Low. Organization was coded as High if the pieces of evidence were easy to identify because the teacher had included a label or an expianation of some sort and put the evidence in some sort of order. Organization was coded as Medium, if, after some searching, it was possible to identify what the evidence was meant to convey. Organization was coded Low if it was not possible to infer the nature of the piece of evidence.

Table 3 Here

Table 4 summarizes the types of comments that each teacher made when writing a statement justifying the unit he/she was teaching. The justifications fit into one of four categories. The categories are: 1) substantive reasons for instruction based on the importance of the subject matter (for example, "Understanding genetics is essential to understanding all of biology."), 2) the relevance of the subject matter to the students (for example, "Despite their veneer of sophistication, I find that my students really don't know a whole lot about sex."), 3) administrative requirements (for example, "It is in the state

framework "), and 4) superficial reasons (for example, "I've always taught it and been successful."). Table 4 also indicates characteristics of the teachers who gave reasons in each category. All of the teachers with less than seven years experience gave reasons for teaching the unit related either to the subject matter or to the needs and interests of students. The teachers who gave reasons associated with administration were either young teachers whose reflection statements were descriptive or experienced teachers who wrote reflections that gave reasons for actions and outcomes. The teachers who gave superficial reasons for teaching a unit were those experienced teachers who did not write reasoned reflection statements.

Table 4 Here

Table 5 contains a summary of the different reasons that teachers considered when planning their units. Some of these reasons were explicitly stated in the plan document itself. For example, at the top of the page with the calendar for the unit plan, Teacher 1 had written, "I hate this period after Christmas Break and before the new semester begins. It is too short to start a new unit and too long to do nothing. So I decided I'd try something I've been wanting to do for a long time, integrating reading and science. Doing the portfolio entry gave me the push I needed." Teacher 8, an experienced teacher, wrote, "I have never been satisfied with this unit [the phyla] and looking at planning from the beginning for the portfolio gives me an opportunity to redesign it." Other times the reasons for the decisions about planning the unit had to be inferred. Only those reasons that were readily inferred are listed in the table. For example, it is not difficult to infer that the teacher wants to students to master content, when there is a list of seven or more content objectives for each day. It is not unreasonable to infer that a laboratory exercise was the focus of the unit when the six day unit plan devotes four days to a series of laboratories. What is noteworthy in Table 5 is that, with the exception of the statements about the importance of content knowledge, all of the statements, except three, are from the plans of teachers who had included reasons for decisions and actions in their statements of justification and

reflection. The three exceptions are from unit plans of teachers, two inexperienced and one experienced, who had written descriptive reflection statements.

Conclusions

These rich descriptions of the evidence in a biology teacher's portfolio about unit planning reveal that the teachers who developed acceptable portfolio entries had a minimum of three types of evidence: 1) the instructional sequence, 2) the justification for the inclusion of the topic in the syllabus, and 3) a reflection, either reasoned or descriptive about the successes and failures of the unit. It seems that these three types of evidence are necessary for an acceptable portfolio entry on unit planning. The portfolios of teachers that were missing one of these pieces of evidence were judged as not acceptable. Those portfolio entries that were rated high contained other forms of evidence such as student work samples or copies of resources, but these additional forms of evidence served to support the decisions of the raters. Further, those portfolio entries that were rated acceptable were sufficiently organized that the raters felt confident making a judgement about what the evidence was meant to convey. The common quality of the unit plans that were judged acceptable is that the statements that constituted the evidence were clear and explicit.

The major differences between portfolio entries judged as acceptable and those that were not acceptable was not a characteristic of experience. The BioTAP staff had feared that writing unit plans was an exercise for student- and intern-teachers and that the difference between acceptable and unacceptable portfolio entries on this activity would be between inexperienced teachers who were still in the habit of writing detailed lesson plans and experienced teachers who no longer do so. This was not true. The difference between acceptable and unacceptable portfolio entries was the ability to reflect on the unit plan and its execution. It appears that portfolio entries that were judged acceptable were done by teachers who had the training, the opportunity, or the personal habit of reflection. It is not surprising that the younger teachers wrote statements of reflection. Reflection has become an emphasis of many current teacher education programs. However, for whatever reason,

whether training or disposition, some of these reflections were reasoned and others were descriptive. The three experienced teacher, Teachers 7, 8, 9, who wrote reasoned reflections, team-teach. They have had the experience of discussing, critiquing, and making decisions about planning collegially. Teacher 18 was the other experienced teacher that wrote reflections, albeit descriptive. This teacher has worked on several national biology curriculum projects, and so has had some experience in teacher interactions. However, he completed his portfolio alone. Teacher 18 is also highly organized and almost excessively thorough.

Implications

Of what importance are these rich descriptions of teacher's unit plans? From the point of view of the research goals of the Teacher Assessment Project, which were to determine if performance-based modes of teacher assessment such as portfolio entries were feasible, the conclusion is positive. Teacher's can organize evidence of their knowledge, skills and dispositions around a unit plan and someone else knowledgeable about quality biology teaching can make a judgement.

That the teachers who were characterized as having acceptable portfolio entries had a minimum of three types of evidence presented in an organized, clear, and explicit manner is surely not new and exciting. Organization and clarity have long been recognized as characteristics of effective teachers. It is heartening that many of the less experienced teachers were able to be explicit about the reasons for teaching biology.

However, if reasoned reflection is the hallmark of designing unit plans that were judged as acceptable, then a major question follows: Why were some teachers able and willing to write such reflections. Until that question is answered, two recommendations can be made. The first is that self-reflection, reasoned as well as descriptive, continue its growing prominence in teacher education programs. The second is that in-service teachers be provided opportunities to develop the habit of reflection through education and on-going collegial relationships that focus on matters of substance.

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Identification	Years of Experience	Overall Score	Unit Planning Score	Type of Reflection	Unit Title
1.	6	3.6	3.5	R	Science News
2.	3	3.5	4.0	R	Cells
3.	0	3.4	3.5	D	Vertebrates
4.	1	3.2	3.5	R	Ecology
5.	5	3.1	3.0	D	BioChemistry
6.	3	3.0	3.0	D	BioChemistry
7.	26	3.0	2.5	R	Photosynthesis
8.	18	3.0	3.0	R	Phyla
9.	28	3.0	3.0	R	Photosynthesis
10.	1	2.9	2.5	R	Human Reproduction
11.	29	2.8	2.0	M	Genetics
12.	4	2.8	2.5	M	Human Genetics
13.	4	2.8	3.0	D	Bacteria
14.	4	2.6	2.5	M	Cells
15.	24	2.6	2.5	M	Genetics
16.	3	*	3.0	D	Cells
17.	5	*	3.0	D	Scientific Method
18.	26	*	3.0	D	Classification

Table 1. Teacher Identification, Years Experience Teaching High School Biology, Average Overall Score on All Assessment Actvities, Average Score on Unit Plan Portfolio Entry, and Type of Reflection (N for none, D for descriptive, R for reasons) [* Did not complete all assessment activities]

Less than 7 Years Teaching Experience			More than 18 Years Teaching Experience		
Reasons	Descriptions	Missing	Reasons	Descriptions	Missing
1	3	12	7	18	11
2	5	14	8		15
4	6		9		
10	13				
	16				
	17				

Table 2 Classification of Teachers by Years of Experience and by Type of Reflective Statement.

Identification	Years of Experience	Unit Planning Score	Types of Evidence	Organization
1.	6	3.5	justification & reflection lesson plans resource materials student comments	High
2.	3	4.0	justification &reflection lesson plans resource materials photographs student samples	High
3.	0	3.5	justification & reflection lesson plans student samples	High
4.	1	3.5	justification & reflection lesson plans & test resource materials list student samples	High
5.	5	3.0	justification & reflection lesson plans list of resources	Medium
6.	3	3.0	justification & reflection lesson plans resource materials list	High
7.	26	2.5	justification & reflection lesson plans resource materials list	High
8.	18	3.0	justification & reflection lesson plans resource materials list	High

Identification	Years of Experience	Unit Planning Score	Types of Evidence	Organization
9.	28	3.0	justification & reflection lesson plan resource materials list	High
10.	1	2.5	justification & reflection lesson plan resource materials student samples	Medium
11.	29	2.0	justification notes some resources	Medium
12.	4	2.5	justification lesson plans worksheets	Medium
13.	4	3.0	justification & reflection lesson plans lab directions	Medium
14.	4	2.5	justification worksheets	Medium
15.	24	2.5	justification some resources	Low
16.	3	3.0	justification & reflection lesson plans & te lists	Medium
17.	5	3.0	justification & relfection lesson plans & tests resource lists	Medium

18.	26	3.0	justification & reflection lesson plans & tests resource lists	High

Table 3. Teacher Identification, Years Experience Teaching High School Biology, Average Score on Unit Plan Portfolio Entry, Types of Evidence included in the Portfolio Entry and Level of Organization.

Reason	Teacher	Characteristics
Related to the Subject Matter	1, 2, 4, 14, 17	less than 7 years experience
Related to Needs of Students	6, 10, 12	than 7 years experience
Related to Administration	3, 5, 7, 8, 9, 13, 16	less than 7 yrs & descriptive reflection or experienced & reasoned reflection
Superficial	11, 15, 18	experienced & did not write reasoned reflections

Table 4. The Reason for Teaching the Unit, The Teacher Identification, and the Characteristics of all the Teachers with Similar Reasons.

Characteristics of Information Inferred From the Sequence of Instruction	Teacher
What Students Were Expected to Learn	
Content	Everyone
Important to Students' Personal Lives	10
Applications of Science	1
Higher Order Thinking Skills	4
The Balance of Content, Process and Social Implications of Science	
Content	Everyone
Some Laboratory Experience	Everyone
Laboratory as the Central Focus of the Unit	2, 7, 9, 13, 17
Stated Emphasis is Some Social Impact on Science	1, 8, 10
Explicitly Mentions All Three Components	4
Selection of Strategies	
Relationship Between Instructional Strategy And Intended Learning Outcome	No one
Explicitly Vary Instructional Techniques to Maintain Student Interest	2, 5, 8, 10, 18
A Logic For The Sequence Of Instruction	
As in a Frequently Used Textbook or Follows District Syllabus	2, 3, 6, 8, 11, 12, 13, 14, 15, 16, 17, 18,
States ThereDoesn't Seem To Be A Sequence Isn't Any Place Else In The Syllabus And It Sort of Fits	5 7, 9
Reorder Text Sequence To Create A More Thematic Approach	4
Begin With What Students Experience	10
Create A Unit Because Of Difficult Schedule Bewteen Beginning Of Calendar Year And End Of Semester	1
Anticpates Potential Problems	
Because it is a New Unit	1
By Revising Daily	2

Table 5. Characteristics Reasons in the Unit Plan Derived from Statements in the Sequence of Instruction.

Appendix A
Biology Teacher's Portfolio Construction Kit

SECTION HEADING SHEET 1

Portfolio Entry Construction Kit
for
Unit Planning

Blank Forms Appended:
Advisor's or Colleague's Statement
Documentation Cover Sheets
Lesson Logs

GENERAL INSTRUCTIONS FOR ALL PORTFOLIO ENTRIES

Section Heading Sheets. These instruction sheets will serve also as section heading sheets to organize your entry. To complete the entry, work through the sheets in order, providing information as requested. When you have completed the last sheet, you will have finished the entry.

To Do. Each section heading sheet will give you some activities to carry out and some issues to address. The idea is to break up the work so that you can do it a little at a time. It is wise to start by reviewing all the instructions so that you can sieze opportunities and avoid unnecessary effort.

To Insert or Enclose. Each section heading sheet will ask you to provide documentation that addresses the issues. Typically, you will insert this documentation following the section heading sheet that asks for it. If the item is too bulky to insert after the section heading sheet, label it with your candidate ID and a title and enclose it with the file when you mail it in.

Documentation Cover Sheets: Occasionally, you will be asked to staple Documentation Cover Sheets to items--or groups of related items--that you add to this entry. This is to make sure that the reviewer will know what the material is and how to interpret it. Blank Cover Sheets will be provided when needed.

Rationale

WHAT'S THE POINT?

As you work through the instructions, you might be asking What do they want? or Why do this? or What will they think of this? We can't supply a full answer without going on and on. This page is our attempt to give you the main points. Your comments on this rationale are welcome; insert them after this page.

In one important form of planning, teachers organize a course as a series of definite chunks, or "units," that address the purposes of the course, serve the students to be taught, and suit the circumstances: setting, seasons and holidays, textbooks, facilities, and so on. So, we want to see how you break the year into units.

Commonly, this unit planning aims to produce a coherent and fruitful sequence of activities on a defined topic over a period of no more than a few weeks. A unit might correspond to a section of a textbook, and might contain a substantial student project. Frequently, the unit is marked off by major student evaluations such as tests, or by some event-- a holiday, the end of a grading period--that produces a break in instruction and presents special problems for the planning. So, we want to see how you organize the unit in a sequence of lessons.

This unit planning tends to proceed in three overlapping phases:
Decisions and preparations made before instruction begins. Here the teacher may take into account his/her responsibilities; biology's content, processes, and social implications; the problems, needs, interests, abilities, and misconceptions of individual students; and the characteristics and development of the class as an organization or team.
Monitoring and adjustment as the unit is taught. Day-by-day, the teacher adapts the unit to students' actual progress, emerging problems and opportunities, unforeseen events, flaws in the initial plan, and so on.
Evaluation and reflection when the unit is completed. Here the teacher is considering the strengths and weaknesses of the unit as planned and taught, and what the students did and did not learn. The teacher is aiming to capture some of that experience for use in the future, for example, when the unit is taught again next year.
So, different sections of this entry will involve the different phases of the planning.

In unit planning, teachers demonstrate important knowledge, judgement, and skill, including the ability:

to organize and specify the various goals for biology instruction.

to select and organize valuable and suitable subject matter for a given class of students.

to arrange and present the subject matter in a form and sequence that is interesting, logical, accessible, and rewarding to students.

to select or construct informative and engaging materials and media.

to select or design instructional strategies that work for the students, the subject matter, and the circumstances.

Thus, several kinds of evidence are required to describe and assess your unit planning. Working with an advisor or colleague will help you to derive the professional benefit of gathering and reviewing that evidence.

SECTION HEADING SHEET 2

LOCATE THE UNIT WITHIN THE COURSE

To do:

Review all instructions so that you will be alert to opportunities for documentation.

Review the preceding Rationale so you will have the issues in mind as you proceed.

Consult with your advisor or colleague to select the course and the unit that you will document in this entry. Treat this as a professional opportunity to talk about what is good in units.

On the following page titled "Units in the Course," list the titles or topics of the UNITS in the course, and mark the unit to be documented. OR, present the same information, under the same title, but in your own format.

On the following page titled "Lessons in the Unit," list the titles or topics of the ending lessons of the unit that precedes the unit to be documented, all lessons of the unit to be documented, and the beginning lessons of the following unit. OR, present the same information, under the same title, but in your own format.

To insert or enclose:

Units in the Course.

Lessons in the Unit.

SECTION HEADING SHEET 3

SHOW THE RESOURCES THAT YOU WILL USE TO TEACH THE UNIT

To do:

Describe or provide copies of the main resources and materials that you will use to teach this unit, such as texts, speakers, movies, laboratory guides, etc. Proceed as follows:

BioTAP has a large collection of Biology textbooks, lab manuals, and workbooks. For such published material, you can write the title, year, publisher, and pages you will be using on a sheet of paper titled, for example "Textbook."

For speakers, movies, videos, etc., you could provide brief written descriptions, e.g., the speaker's qualifications and topics, the title and a brief summary of a movie, etc. Title these pages as appropriate.

Other important resources could be photocopied or photographed and inserted here. Staple a completed Documentation Cover Sheet to each of these items or closely related groups of items; blank copies of the Cover Sheet are appended

To insert or enclose:

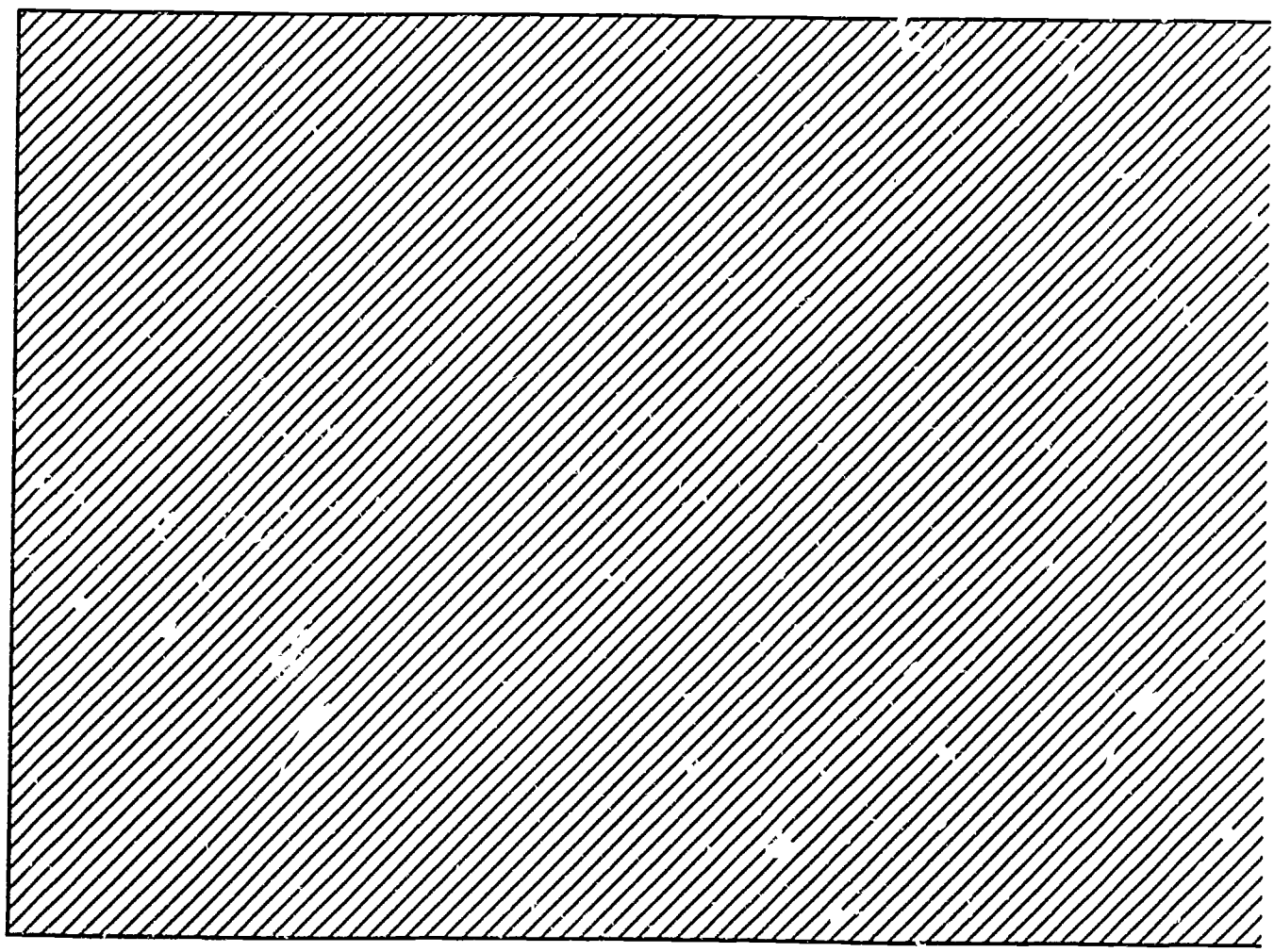
The information about your resources and materials, with Documentation Cover Sheets as needed. If an item is too bulky to insert here, insert its Cover Sheet, label the item to match the Cover Sheet, and enclose the item with the folder when you send it in.

List your insertions and enclosures here:

Documentation Cover Sheet

Describe the material attached (or labeled and enclosed):

What does a reviewer need to know about this material--or about its use--to interpret it correctly?



SECTION HEADING SHEET 4

PROVIDE A RATIONALE FOR THE UNIT

To do:

Review the documentation that you have prepared so far, and any other materials that may help you to have an clear image of the unit fresh in your mind.

Under the title "Rationale for the Unit," write a paragraph or so on each of the following issues:

Value: What makes this unit worth the time, effort, and expense required to teach and study it? Put another way, why would a biologist, a school board member, and a student all want you to teach it?

Design: How are you organizing, adapting, and presenting the subject matter to make it interesting, accessible, and learnable for the students? What has led you to shape and order the lessons as you intend?

Results: In terms of knowledge and skill, from where to where should students move in this unit? That is, what do students need to know or be able to do when they begin this unit, and what will they gain from it?

To insert or enclose:

Rationale for the Unit.

SECTION HEADING SHEET 5

SHO. .IOW THE UNIT IS CARRIED OUT IN LESSONS

To do:

For each day of the unit, complete a Lesson Log (blank forms are appended). You might find it efficient to begin preparing these logs in conjunction with your lesson planning.

The object of the Lesson Log is not to go into details of instruction; that belongs to other portfolio entries. Rather, the aim is to trace your day-by-day decisionmaking about the unit. Accordingly, the Lesson Log asks four kinds of questions:
Your intentions: What will the students learn today? What main methods and materials will you use to achieve that result?
Your reasoning: How will this lesson help to achieve the purposes of the unit?
Your assessment: How did the lesson go, compared to your intentions for it?
Your adjustments: In light of what happened today, how did you or will you adjust your plans?

To insert or enclose:

A Lesson Log for each day of the unit. Ten Lesson Logs are appended; make additional copies as needed.

SECTION HEADING SHEET 6

EXAMINE THE UNIT AS PLANNED AND TAUGHT

To do:

Assemble your materials, including the section heading sheets, in the order given in the table of contents in Section Heading Sheet 1.

Review the materials with your advisor or colleague. Discuss these questions:
Did the students learn what you intended them to learn? How do you know?
What worked in this unit? Why?
What didn't work? Why?
What would you do differently another time?

Draw on that discussion to write two or three pages titled "Reflections on the Unit."

Obtain your Advisor's or Colleague's Statement.

Number all pages of the entry in order; enter the relevant page numbers in the table of contents on Heading Sheet 1.

Mail the folder and enclosures to: Teacher Assessment Project, Attn: Angelo Collins, CERAS 507, Stanford University, Stanford, CA 94305-3084.

To insert or enclose:

Reflections on the Unit.

Advisor's or Colleague's statement.

Confirm that any material that could not be inserted is enclosed with the file when it is mailed.

Lesson Log

Date: Lesson Topic:

Intentions: What will the students learn today? What main methods and materials will you use to achieve that result?

Reasoning: How does this lesson serve the purposes of the unit? What does it contribute?

Assessment: How did the lesson go, compared to your intentions for it?

Adjustments: In light of what happened today, how did you or will you adjust your plans?