

GS-4 TA Manual*

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Introduction

Welcome to the Oceanography course. This course gives us a great opportunity to teach non-science majors about the earth. For many of our students, this will be their only science course. They will become members of that diverse population of voters who will determine the future of science and science funding. In addition, the human population is altering our environment on a global scale. Our population will be called upon to support reasoned approaches to the exploitation and management of the earth's resources. Those who stand to gain from quick exploitation, in the short run, will attempt to confuse the issues. Our students will have to decide for themselves and vote accordingly. We can have a positive impact on the future of our planet by doing the best job we can to educate our students about the earth.

Overall goals:

- Scientific thinking and the process of doing science
- How to determine the credibility of claims about science
- A recognition of the complexity of earth processes
- Basic knowledge of earth processes

Duties

Attending Lectures

Many TA's have difficulty understanding why they should attend lectures, since they already know the material. However, students notice whether the TA's are attending lectures and this is a major factor in maintaining credibility. Students want TA's to know what's going on in the course and what the professor wants. This can only be accomplished by your attending lectures.

In addition to the credibility issue, the TA's help with handouts before the lecture and with picking up papers when needed. This is also a time when students can ask you a question about sections or contact you for any reason. Students appreciate your availability and this can save time for you by reducing the need for office hours visits.

Please be at lectures 10 minutes early

Office Hours:

You need to have 2 office hours, at times when the students might be able to contact you. Please hold your office hours in the computer lab during open access hours. Students can ask you questions about their computer work and generally have an easier time finding you.

* This manual is the first draft. Please let me know if I have left anything out, or make suggestions for improvements

Homework grading:

Homework grading duties are very light in this course. In fact, there are no homeworks or lab assignments to grade during the first half of the quarter. Your most time-consuming job will be to grade the mid-quarter scientific papers.

During the last half of the quarter, you will be asked to grade a lab assignment each week.

Please return all student work within 1 week after the due date.

Lab assignments should be graded on an “Ok”, “Poor”, “Excellent” basis. This would be ✓+, ✓, or ✓-. This rewards students who put forth extra effort during lab sections. The coarse grade scale allows you to quickly grade the labs.

When entering grades:

- ✓+ = 100%
- ✓ = 90%
- ✓- = 80%

This system means that students get a C+/B- for simply being in the lab and handing in an assignment.

Grades will be entered into the students’ records using software for the class. A students’ grades are then available to him/her as soon as they are posted.

Preparation

The students look to the TA as an “expert”. If you can answer their questions in a knowledgeable way, they will gain trust in you. The instructor will meet with you as a group each week and individually if problems arise.

Before the quarter begins:

You will need to become familiar with the overall software and pedagogy for the course. A meeting prior to the beginning of classes will last approximately 4 hrs and will introduce you to the software to be used in the class

Preparation for each Week’s section

The following preparation will enable you to run an effective section. Students will be asking you about material in the lab book. You should have read it. Also, the lab manual describes the week’s activities, with which you must also be familiar.

- Read lab manual chapter for the week’s section
- Read TA manual section material
- Work homework problems and enter answers into the computer

Please read the lab material before each week’s section meeting.

The first section

The first section is where the students get their main impression of you. It is here that you can most easily get their confidence and set down rules and limits that will make your job easier during the quarter.

Setting the tone

The first section is where students acquire attitudes that they will keep during the entire course. It is important to project confidence. If you don't feel confident, fake it. It will come. Let students know that deadlines are definite and late papers will receive penalties unless proof of illness is presented. If you are "soft" at this point, many students will try to take advantage of you, making your life much more difficult. You can soften up later, as special situations arise.

Suggestions for the first section:

1. Ask students to assemble at the tables (away from the computers)
2. Introduce yourself and write email address, office hrs, and location on the blackboard. A handout might be useful.
3. Explain homework grading procedures (extract from Lab book)
4. Remind students that missing 2 lab sections is an automatic flunk, and lab sections must be made up during the week they are missed. For students in sections later in the week: "if you know you are going to miss, come to a section earlier in the week".
5. Remind students that they are responsible for knowing all class policies, which are stated in the first section of the lab book.

Section Activities and Group Work

In this course, you are asked to use possibly unfamiliar teaching methods. Group learning techniques are used extensively during lab sections. Research has shown that students retain very little of lectures. In a normal lecture, they retain 70% of the information during the first 10 minutes, but only 20% during the last 10 minutes. We know that when we teach the material, we remember it much better than if we just hear it. Furthermore, it is much more important that students actually *understand* the material, rather than just memorize facts. Group exercises require students to learn to work as a team. Students also make presentations to the class. You can assess student learning by observing the results of these activities.

Consider yourself a facilitator, not a lecturer.

The following table contrasts the conventional classroom with the one that relies on collaborative learning (modified from Brooks and Brooks, *A Case for Constructivist Classrooms*, pub by ASCD, 1993):

| Conventional Classroom | Collaborative Classroom |
|--|--|
| Teacher presents material by lecturing. | Teacher sets "big picture" problems, then asks students to collaborate to find answers. |
| Fixed amount of material is covered. Students are tested on answers to specific questions. | Pursuit of student questions is valued. Students are encouraged to "synthesize" through writing and class presentations. |
| Activities focus heavily on canned exercises ("plug and chug"). | Activities are focused on primary sources of data and its interpretation. |

| | |
|--|--|
| Teacher seeks the “correct” answer. | Teacher seeks the students’ point of view in order to understand students’ present conceptions for use in subsequent lessons. |
| Assessment of student learning is viewed as separate from teaching and occurs almost entirely through testing. | Assessment of student learning is interwoven with teaching and occurs through teacher observations of students at work and through student exhibitions and portfolios. |
| Students primarily work alone. | Students primarily work in groups. |

It is not trivial to learn to use collaborative learning methods. There are many ways of going wrong. It requires tuning in to what’s happening in the classroom and a willingness to try a range of techniques to enhance learning for each unique collection of students.

Group methods to be used in this course are specified for each lab section. The following group methods have been selected as an overview to help familiarize you with a range of possibilities and get you started smoothly.

Group Method 1: Class discussion

We have all been in a number of class discussions. This is the simplest of structures, yet most often the most difficult to use successfully. Generally, the professor asks a question and someone in the class volunteers an answer. When the correct answer is given, discussion may stop. The instructor may amplify on the “correct” answer. The best discussions occur when the instructor is non-judgmental. Better yet, the instructor may write all of the volunteered answers on the board, then asks the students to discuss which of the answers is the “best” one. Another pitfall occurs when students are asked to “amplify” their thinking on a wrong answer. Students quickly get to know that when they are asked to “amplify” their answer, they are probably wrong. Better yet, examine each answer for underlying thinking so that students will get used to being asked to amplify correct answers too. This gives you an opportunity to examine their reasoning to see if they understand beyond a memorization of facts.

Tip: When the question is posed, allow students time to think about their answer. Invite them to discuss it with their neighbor(s), or possibly look it up in the book. The discussion is almost always much more lively when students all get a chance to think about questions posed from the podium.

Avoid: Instructor asks question, student gives answer, instructor gives correct answer. This misses an opportunity for the instructor to find out the student’s thinking and assess possible missing or incorrect concepts. It also wastes the opportunity for other students to share their views.

How do you know if the discussion “worked”? You will know it when it happens. Students express themselves, alternative ideas come up, the class becomes “lively”. Ideally, the correct answer comes from the students themselves.

How long do you wait for the correct answer? Students hate to be left hanging. Closure is important. If there is no correct answer, even after giving hints or inviting a quick look in the book, you can give the answer. When appropriate (maybe it’s a major point), you could leave it as an assignment for next section.

Important principle: Students will remember answers they find for themselves much longer than answers that you provide for them.

Group method 2: Group Discussions

A better way to begin a class discussion is to start with a general question, break students into groups of 3 or 4, ask them to prepare a presentation on that topic. After enough time has elapsed, have a representative from each group make the presentation before section is over. We will use this method to provide feedback on students' short writing exercises.

Group methods can work extremely well, or fall flat as a cat on a freeway. Certain ingredients must be present. These are:

A well-defined task:

Specifically, what is the "product" expected from the group discussion? What issues are to be addressed? When the issues are addressed, how are the results to be presented to the instructor? The discussion could result in a homework assignment that is turned in at the end of section. It could be the construction of a class presentation.

Example of an ineffective group activity: Students were asked to break into groups and discuss each others' short writing assignments. They were told to read each paper and pick the best one. A representative from each group was then asked to read the best one to the class. The instructor made comments on each presentation. Nodding heads and silence were predominant by the end of this seemingly endless section. This activity could have been improved immeasurably if students were asked to critique each paper on the basis of specific criteria, or to identify certain kinds of statements in the papers. Also, they could have been asked to give feedback on possible improvements to the writing so that each student could revise and improve his/her paper. The class presentation could have been the selection of several of the papers for class discussion. The discussion could have focused on how descriptions could have been improved, ideas of quantitative vs qualitative descriptions, the difference between observations and interpretation, or other matters germane to the goals of the section.

Strict time limits:

It is very easy for group activities to devolve into socializing, or get completely off the track. The instructor must keep careful track of the time. The groups can be reminded when time is nearly up. When there are several tasks, it can also be helpful for each group to choose a time-keeper, who makes sure each task is accomplished in the time allotted.

Accountability:

Students will work best if they know their work will be missed if they don't do it. The results of group activity should be either a paper assignment, a class presentation, or some other product that will be at least seen by the instructor. Group activity will be ineffective if general, non-specific tasks such as : "critique the paper", or "discuss global warming" are given. Until students know what specific tasks are involved in critiquing a paper, or what specific methods they should apply, the goals for the group exercise must be made quite clear. However, don't make the mistake of turning the exercise into a "plug and chug". Concentrate on goals and methods rather than specific tasks. **An example of a "plug and chug" task is:** *Measure a profile across the Atlantic Ocean. What is the maximum depth? What is its minimum depth? etc.* **An example of a collaborative task is:** *Examine the earthquake distribution on a world map for evidence of plate tectonics. Hints: look for ... and Can you use earthquake evidence to identify the 3 primary kinds of plate boundaries?*

Remember: Students will not automatically know what to do in a group. The instructor must also teach them this process. As the class progresses, and students learn group methods, more complex activities can be used successfully.

Group method 3: Simulating constituencies

This method invites students to identify constituencies in an issue. For this class, the issue is the health of the world's fisheries. Constituencies are the environmentalists, commercial fishermen, 3rd world subsistence fishermen, stockholders of commercial fishing companies (e.g. Starkist), etc. Students are asked to prepare for section by reading a paper and answering questions about it. The section begins with a class discussion about the prepared material. Constituencies are identified and their broad interests are discussed. Students are divided into groups. Each group is asked to select (or is given at random) one of the constituencies to represent. Students then use the world-wide web to search for information to support their constituency's "interests". A panel discussion with representatives from each constituency is conducted the last 45 min of class. Debate is encouraged.

This method requires an issue with many sides to it. It also requires that students come to class prepared.

Tip: Class presentations are much less threatening if students are allowed to make one or two transparencies during their group work. When students give presentations without transparencies, encourage them to write their points on the blackboard.

Tip: Students generally don't know how to make a class presentation. Encourage them to make 2 or 3 main points, write them on a transparency, or on the blackboard. Ask them how they like the professor to present his/her material (spoken only, or spoken and graphic?).

Group Method 4: Working problems

I have found this method of working homework problems to be extremely effective. It works best when problems are new to the class, so that students who prepare are not "carrying" those who don't. Students break into groups of 2-4 and work the assigned problems. Answers are handed in by each student at the end of class.

Advanced group method:

Better yet, each group gets a different (smaller) set of problems. The groups are instructed that each member will be joining another group, where he/she will have to teach the solution of the problems. This "invests" each person in knowing how to get the solution of the problems. When the problems are solved, the groups shuffle so that one representative from each of the original groups is in the final groups. Each person, in turn, must teach the others how to solve the problems that came from their original group. The complete homework set is then handed in by each person. The advantage of this is that each person is "on the spot" for knowing a subset of the problems. Since each person hands in the complete set of worked problems, they must pay attention during the final group activity. In fact, the teaching of the subset of problems gets each student more involved in the overall problem set. Also, weaker students are helped by stronger ones, who get the added benefit of teaching.

Computer software

This course uses "Our Dynamic Planet" software, created by W. Prothero. Each time it is used, an updated version is produced by the UCSB bookstore and sold as part of the "Lab Manual".

Importance of the student's first experience:

I have had a great deal of experience with what can go wrong in a class that uses computers. I have found that when the first exposure is successful and fun, students buy in and are much more tolerant of the inevitable computer glitches that tend to be a way of life in the computer world.

It is vital that you be prepared and confident, especially during the first section. The way that you can do this is to do all of the computer exercises for the lab section prior to your first section. This also means working all of the problems and entering the answers in the computer. You also need to be familiar with what on-line help is available and how to use the program's features. This won't be hard. Students find the program easy to use.

Helping students learn the software. What you need to know

Here are some situations that you will have to deal with the first section.

Students logging in the first time: mailboxes and perm #'s

The first time a student logs on, the software searches for the student's name in a class list. If his/her name is in the list, a mailbox is created and the student is directed to a simple tutorial. If the student's name is not on the list, login is refused. A student's name may not be on the list because:

- He/she is not in the section he/she registered for
- He/she changed sections and the name didn't get on the list

You can force the system to make a mailbox for a student not on the section list.

Before you force a new mailbox, make sure the student does not have a mailbox in another section. You can access the "Admininstructor" program from the server to make sure of this. Run "AdminInstructor", log in, then click on the "Class List" button. This generates a class list from all of the mailboxes in the sections. Check to see if the student already has a mailbox. If he/she does, use the "Change Stud Section" under the "Mailbox Management" popup menu to change the student's mailbox.

To force a new mailbox to be created, hold down the option key after the student has entered his/her name and perm, and selected a section. Click "Yes" on all dialogs until a password dialog comes up. Enter the TA password. A mailbox is created for the student.

Encourage students to become familiar with the on-line help.

There are a number of on-line help features available to the student. These are:

Balloon Help: Click on the “Balloon” icon. Slowly move the mouse over the buttons on the screen, and a “balloon” of text explaining what the button does will appear.

Help Buttons: Often there is a button on the screen named “Help” use it.

Info: This is a popup menu that accesses various kinds of on-line info. In “Class Master”, there may be a “Screen Info” item, which gives detailed information on how to use the various features of that particular screen. The student can also display text files such as the class syllabus, TA info, etc. that are put into a folder in the mail system.

Tutorial Movies: The Map, Profile Game, and Where Am I? software has tutorial movies that play a complete demonstration of the software. Used with Balloon Help, the student should quickly learn how to use it at an “expert” level.

Ask another student: We hope to create an environment where students feel free to help each other. Encourage this.

Ask the TA: Some students learn best when they get a personal demo. I’ve had good success in interesting some students by showing them how to plot quakes and showing how the data varies for various plate boundaries.

BUGS:

The software will most certainly have some bugs, hopefully only a few. It is very important that you report bugs to me. However, the only way I can fix a bug is if you can give me a clear procedure or description of how to make it happen again. If I cannot make a bug happen, I cannot fix it.

Security:

Almost all of the students will be too busy to try to “hack” their way into the grade system. Access is protected by a) your password and b) the classroom monitor. Please don’t write down the TA password in your lab books. TA lab books have disappeared. If this happens, please notify me ASAP and I will change the access passwords.

Labs:

Note that all of the lab exercises that use group work have specific times for each activity listed at the start of the lab manual chapter. It is very important to follow these times, as well as possible. The activities are arranged to give students time to work on their own and in groups, then to end in some kind of integrative activity like a class presentation or discussion. Most often, the very last activity is what ties the entire section together. It is very important to try to get through the complete cycle of activities in each lab. Remember that student presentations will “want” to go overtime.

Lab Section #1

It is not necessary to prepare lectures or other coverage of the material. Students are responsible for coming to the section prepared, having read the lab workbook sections.

The activities for this lab are contained in the Lab Book, pge. 49. Some comments on some of these activities follow:

Activity #1: Homework entry

- **Logging in by students not in your section:** Force the creation of a mailbox in your section. This keeps them from getting "lateness" penalties for their homework entry. After the lab, or same day, move their mailbox to their correct section. Be sure and do this, or they may create a new mailbox in their "registered" section.
- **Homework Entry:** The main issue will probably be "not enough time". Students are required to get 50% of the answers correct in order to get a "no penalty" chance later in the week. If you find a student has worked the problems in their lab book but cannot complete the entry in time, and gets less than 50%, offer to "force" his/her grade to whatever he/she gets by the end of the week. Take his/her name and perm to do this.
- **Watch for frustration:** Offer "forced" score if student needs more time, but has shown good faith in working the problems before the section start time. Check her/his lab workbook.

Activity #2: Introduction

- How you introduce yourself is obviously up to you. During the introduction, please cover:
 - a) Guidelines for group work.(see p38 of lab workbook). These methods are used at many other universities, in many settings, but they require careful student preparation. They work!
 - b) Try to create a sense of community within the classroom. If there is time, you could have students each give their name and where they're from (or major, etc). Help them get to know each other. This will pay off as they work in groups and help each other during the sections.
 - c) Open access hrs signups. Do any time during section, or later. Sign up for 2 blocks.
 - d) Remind students about missed lab policy.

Activity #3: Forming groups and entering description text

- **Group work:** I suggest you rearrange groups each section. First section, you can let students pick their own, or randomize, whatever feels ok to you. Varying group membership gets all students to know each other and spreads around the best and worst prepared students. In the working world, groups do not generally choose their own members, and it is a valuable experience to learn to work cooperatively with a variety of personality types.
- **Printing:** There may be a jam-up at the printer. All print jobs will be in a queue. Each student puts in his/her Vend-A-Card while a single piece of paper prints, then the next student must be ready. Some students may be paying for another's page, but someone else will pay for their page. If someone feels cheated, promise to use your own vend-a-card to give him/her free printing at another time.

Good Luck!

Lab Section #2

Main goals of the section:

- Begin to become familiar with the “Map” software and how to access data using it.
- Begin to associate plate boundaries with kinds of data they see on the map.
- Begin the small area description, which is due before next week’s section.
- Practice in quantitatively measuring and describing simple topographic features.

HW #3 Small Area Description:

This is where students get a head start on their MT paper. Emphasize the importance of this problem. Note that it must be typed into the computer before the next lab section (and handed-in electronically). Four hard copies, with figures, must be brought to the section for group discussion. It will be discussed in groups during section 3, and you, the TA, will be making comments on either the hard copy or the electronic version.

The electronically handed in version will not include figures, so the students will have to make good captions.

Lab Section #3

Main goals of the section:

This is an extremely important lab section, as it is the last section to prepare the students for the MT paper. Each student should leave the section with at least a preliminary outline of their MT paper and complete familiarity with the MAP software. We use group discussions to facilitate this process. You will need to watch the clock, because there are quite a few important activities for this section.

Small Area Description: This should have been entered prior to section. They should have four copies for distribution to group members. The discussion and group evaluation of this problem is a very important activity in preparing them for their MT paper. If a student is late with his/her write-up, this is in his/her record because electronic hand-ins are recorded.

Group discussion and evaluation of Small Area Description: Please use the methods I suggest for group discussion of the papers from section #1. Please note the guidelines in the “Section 3 Activities” section of the lab manual. Add and criteria that I may have neglected.

Special Problems:

Make sure the group keeps “on task” and watch the clock. It is very easy to slip and leave insufficient time to complete the section work.