Attached is my comprehensive Sabbatical Leave Report. I certify that I have fulfilled the objectives of my sabbatical leave and will render the amount of service required by District Policy – Administrative Procedure (AP) 7341.

NAME:  ________ Herschel Stern

DATE SUBMITTED:  _______ Feb. 10, 2017

ACADEMIC SCHOOL YEAR IN WHICH LEAVE WAS TAKEN:  _______ 2016-17

SEMESTER IN WHICH LEAVE WAS TAKEN:  _______ Fall 2016
(NOTE: If this was a full-year leave or a variable leave, please indicate this. Do not include any unbanking as part of a sabbatical leave)

CHECK (X) TYPE OF SABBATICAL LEAVE:  _______ Advanced Academic Studies, or

X____ Self-directed studies

SIGNATURE:
(Hard copy of this page must include your actual signature on line above.)

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Applicant should not write below this line.

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<td>Academic Senate President</td>
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Herschel Stern, Page 1 of 28
II. **Re-statement of Abstract of Sabbatical Leave Application**

The purposes of the sabbatical leave are to develop a deeper understanding of pedagogical possibilities in two separate geography courses and to create specific materials for use in these courses. The first course is Physical Geography Laboratory. I will look at recent technological changes and pedagogical developments in the field to understand how to better achieve the objectives and student learning outcomes of the course. My primary outcome will be to create four to twelve reproducible lab exercises. The second course is World Geography. I have recently changed how I teach this course from using a traditional textbook to a much greater focus on current events and interactivity in the classroom by using a news magazine instead. As my primary outcome, I intend to develop course materials such as maps, concept articles and data sources that will provide a more systematic background for this approach than the commercial materials currently available that I assign for such purposes.

III. **Completion of Objectives, Description of Activities**

**Objective #1:**

a. Explore recent technological changes and pedagogical developments in the teaching of Physical Geography Laboratory.

b. To accomplish this objective I investigated a variety of lab manuals and digital resources currently available in the field. I also consulted with colleagues that teach physical geography laboratory classes at other colleges including Palomar College and Grossmont College, as well as colleagues that teach the class or similar classes at MiraCosta, including physical geography laboratory and geology laboratory. I certainly developed a deeper understanding of the general status of the field and its recent developments.

The review of published lab manuals was a straightforward process of content review. While the manuals I investigated varied in exercise details and emphases, the outline of the physical geography course at the introductory lower division level is fairly standardized, as is the laboratory course associated with it, and the lab manuals generally followed this standardized procession of topics without much in the way of surprises. The ultimate lesson of this review of commercially published materials was that there is no great new physical geography laboratory manual that is going to radically change the curriculum or pedagogy of the course.

The review of online materials followed a similar pattern of content investigation of standard physical geography laboratory exercises available online and more recently available supplementary instruction provided online by physical
geography textbook publishers, particularly the Mastering Geography site by Pearson, the publisher of the physical geography textbook that has been used at MiraCosta College for a number of years. While the online supplementary instruction is interesting, and is sometimes set up in an exercise format, it is most appropriate as a pedagogical aid to the physical geography lecture course, as it is designed to be. The availability of online lab exercises in collections or as miscellaneous individual exercises was less than I expected it would be. There are several geography programs around the country that offer online laboratory classes and some of them include custom online exercises, but they are generally available only to students in those classes. The exercises I found online were of a typical variety similar to published lab books and, if they were distinguished at all, were usually most distinguished by their location focus on their students’ local area. This brought my thinking back around to the lab manual I was using in the first place.

Part of what motivated this sabbatical’s focus on the physical geography laboratory course was concern I had developed with the laboratory manual I was using to teach the course last year. The appeal of the lab book is that its authors are geographers at Palomar College and the exercises are particularly geared towards community college students in North County, including material that focuses on our local geography in a way that engages students. However, I had concerns regarding emphases, particularly regarding some topics that I thought needed greater depth of coverage. Ultimately, the result of my researches has given me a greater appreciation for the appropriateness of the Palomar geographers’ manual for teaching at MiraCosta College. I ultimately needed to direct my attention to producing laboratory exercises that would make up for things I think need greater emphasis or are missing in the current lab manual.

The most enlightening part of this investigation of pedagogy and technology was a series of consultations with other physical geography or geology lab instructors. Charlene Wright taught the physical geography laboratory at MiraCosta last fall. She did so using the standard laboratory manual designed to accompany the textbook we use and shared her insights on which parts of the book she used, some approaches to supplementing the exercises and the equipment available at MiraCosta College. John Turbeville shared some of his insights with me regarding teaching the geology laboratory online at MiraCosta College. Some of his local field trip ideas are quite interesting and bring a geographical perspective as well as a geological perspective to local field exercises. A significant problem in transferring some of his insights into bringing the physical geography laboratory online or using hybrid instruction is that he is able to have his students order a commercially available laboratory pack of equipment and samples that they use to complete the various exercises. No such commercially available pack of materials exists for physical geography laboratory.

I spent a singularly enlightening day at Grossmont College with Judd Curran, the chair of their geography department and one of three principal creators of
their customized approach to teaching physical geography laboratory. I (and they) consider it a remarkable achievement of geographic pedagogical design. However, extracting elements that are appropriate for MiraCosta’s course is not easy for a number of reasons. My graduate training at the University of Oregon gave me a solid grounding in both the physical (natural science) and cultural (social science) sides of the discipline of geography which was ideal preparation to become a program head at MiraCosta, where I am the only full-time geographer and need to manage and teach both sides of the field. However, my interests and expertise lean more towards cultural geography than physical geography. The course at Grossmont has been under a continuous process of development by three full-time physical geographers for twelve years. They work on it cooperatively virtually every semester generating revisions and new content. Multiple sections are offered every term and they are only ever taught by the three full-timers responsible for the course’s development. They have an ever-present lab assistant devoted to their program. At MiraCosta, we safely offer a single section of the lab every semester and it is usually taught by associate faculty, working on their own (although Larry Hernandez is helpful in organizing our equipment in the lab prep room). Even if I devoted myself to the task full-time, I could not replicate what they have done at Grossmont.

A second major factor supporting Grossmont’s unique approach is how the campus works as a living laboratory. The natural environment surrounding the campus lends itself to comparative field explorations in a way that is simply unavailable at MiraCosta, with its more constrained Oceanside campus surrounded on all sides by suburban development. More significantly, thanks to funding from bonds in recent years, Grossmont has devoted what I imagine are hundreds of thousands of dollars to crafting the campus landscape to support instruction in various fields by methodically creating large, explorable examples of different ecological zones that reflect the Southern California environment, in addition to a veritable botanic garden planted around the campus. Now that we have some bond money coming at MiraCosta, I recently broached the subject of this kind of landscape design with Tom Macias, Director of Facilities and Ralph Pickering, Head Groundskeeper. They are unsurprisingly supportive in principle, but the bond is not particularly large relative to our current needs and plans, so there is not likely to be extra money available for such projects.

Having given a lot of thought to my experience at Grossmont, once I got over my disappointment at what I would not reasonably be able to do, I focused on what I could do, that is what I learned that would be useful for me at MiraCosta. One of the things they have done at Grossmont is that they are very flexible about topical progression through the course. As implied in my review of lab manuals, this course is usually taught as a series of discrete exercises about separate topics that generally corresponds to the progression of topics in the lecture course. The geographers at Grossmont however, mix, match and repeat disparate topics in lab sessions throughout the course, without a rigid concern for keeping the individual lab sessions topically consistent or topically aligned with the lecture course. They cover the requisite lab course content eventually,
but their approach allows them to scaffold the learning of skills in a manner that improves student understanding and performance. I think this flexibility of topics within single lab sessions and the iterative, scaffolded learning it allows for, are the most important aspects I took from this thought provoking exploration of the Grossmont program.

I spent another day investigating the physical geography laboratory course at Palomar College with Catherine Jain, who, along with Doug Key, is the author of the lab manual referred to above. After sitting in on her class, she led me through a detailed review of the facilities and we talked about the course at length. Since I am quite familiar with her lab book, we were able to address small details in a productive way. Our meeting bolstered my understanding that the Palomar lab manual would work better for me at MiraCosta than other available publications. I could best achieve my personal aspirations for the course through the development of supplementary and substitute lab exercises, which aligns with what I set out to do initially in this sabbatical project.

c. I spent 124 hours on this activity as per the log provided in this report. The documentation includes an annotated list of published and online resources I reviewed and people I consulted with to achieve this objective.

Objective #2:

a. Review the current laboratory equipment available at MiraCosta and investigate the acquisition of replacement equipment.

b. I went through the physical geography laboratory prep space in OC 4527 and the classroom in OC4529 several times to inventory equipment and collect materials to aid my sabbatical project. I also met in the lab and prep room with Instructional Associate Larry Hernandez to complete my inventory of equipment and resources and determine if some things I was unable to locate on my own were actually there or not (sometimes they were, sometimes they weren’t). Larry was particularly helpful in showing me some equipment that I was unaware of from other types of lab courses that might be helpful at some point in the physical geography laboratory course.

A principal impetus for this objective of my sabbatical leave project was my sense when I taught the course in the year prior to the sabbatical, that the maps of North County were outdated (mostly from the mid-1990s or even earlier) and this diminished student interest. Since a substantial portion of the course focuses on map skills, I thought it would be appropriate to have class map sets of our local communities that reflect the way they are now. This turned out to be more difficult than I expected. The United States Geological Survey (USGS) is updating 7.5 minute map quadrangles for the digital age, but their process works in partial, iterative, three-year cycles. The revision that should ultimately produce maps appropriate for lab use is not expected to be completed until around 2020 and given the current uncertainty surrounding federal environmental programs, who knows? In discussing this situation with both
Judd Curran at Grossmont and Cathy Jain at Palomar, they are both content to be using the mid-1990s maps. Oddly enough is this rapid-turnover, digital information age, it’s the best we can do. So I have no need at the present time to create a list of new maps we need.

I was particularly interested in new equipment that might support new lab exercises, but once I settled down to what is possible and reasonable regarding new exercises, I settled on two key equipment problems. First, half (6) of the units in our collection of GPS handheld devices are no longer functional, so my initial thought was the possibility of acquiring a larger class set of more modern GPS devices. GPS use is highly integrated into the physical geography laboratory at Grossmont, and my visit there left me interested in the possibility of incorporating more GPS use into our lab, even though the previously discussed environmental constraints at MiraCosta preclude the intense usage possible at Grossmont. However, when I had my consultation with Charlene Wright, we discussed a simple supplementary exercise she did using GPS. Since there were not enough functional GPS devices at MiraCosta for the students, rather than just waiting around to get a working device while the exercise was taking place, a number of students starting using GPS apps on their smart phones. Although the accuracy and features of such apps are not up to those of dedicated devices, they worked well enough at essentially no cost to the college. One of the lab exercises I developed to meet Objective #3 is complex enough to test the limits of this technology. I’ll find out this spring. But I have no need at the present time to request new GPS units.

The second equipment problem relates to our soil test kits. It is silly at this point to restock the pH test strips, as this simply does not reflect how testing is done in the field any longer. We need a class set of electronic pH testers appropriate for soil and water. As it happens, these will constitute the entirety of my equipment request list, included as documentation at the end of this report.

Also related to lab equipment, I have had a longstanding interest in computer-based lab exercises in the classroom. At both Grossmont and Palomar, given their relatively new facilities built with bunches of bond money, their earth science laboratory classrooms are outfitted with a full-screen, pop-up computer at every seat. In my consultations with Judd Curran and Cathy Jain, both of them indicated that the computers are underutilized during the physical geography laboratory course. While some publishers make computer-based, online exercises available to students, the students must purchase a new version of a proprietary product at much higher expense than the customized lab materials their students use. These types of exercises are not the sort of thing I have the skills or interests to develop independently, nor are they among the various exercises I was able to locate through online research. There is one computer-based exercise in the Palomar laboratory manual, and it is adequate to MiraCosta’s purposes for any instructor that wishes to use it. So I have no need at the present time to create a list of new computers or software we need.
c. It took me 57 hours to achieve this objective as per the log provided in this report. The list of requested equipment is included in the documentation.

**Objective #3:**

a. Create reproducible lab exercises.

b. I authored 7 lab exercises of my own based on what I learned in Objectives #1 and #2. The exercises are titled as follows:
   - Direction
   - Field Exercise: Location Determination and Interpolation
   - Location and Direction II
   - Basic Earth-Sun Relationships
   - Reading a Sun Chart
   - Profiling Relief
   - Relief and Intervisibility

c. I spent 146 hours to achieve this objective as per the log provided in this report. Excerpts of the lab exercises I produced are included in the documentation.

**Objective #4:**

a. Review commercial resources such as books, websites and other digital resources, available to support a current events focus in World Geography.

b. To accomplish this objective I searched and reviewed numerous websites and reviewed a number of books, particularly atlases, in hard copy. Similarly to my searches in relation to the Physical Geography Laboratory component of this sabbatical project, the online searches did not reveal as much easily usable, appropriate material as I had originally expected.

One of my original thoughts had been the possibility of acquiring or assembling an online “reader”, that is a collection of digitally accessible articles that could serve as required background reading for students. It turns out that no sources provide such a reader, nor can one be easily assembled. I looked into assembling a wikibook out of Wikipedia articles or doing something similar with a large range of available topical articles, but most topical online articles offer too much detail and not enough focus on the aspects that matter for interpreting contemporary news events. Following this approach would have produced a less coherent set of background materials than is typically provided by a world geography textbook, without enough reduction of the students’ reading efforts to leave enough time for reading the news to maintain a current events focus. The choices of available published and online background reading materials were not going to meet my needs. Of course, there are a number of good college-level world geography textbooks, many of which provide excellent background
materials to understanding world events, but they allow little time for focus on current events. My rejection of these materials is what got the new course approach and the world geography aspect of my sabbatical project started in the first place. Ultimately, I was convinced that to get the background materials I wanted in a form that aligns with my course structure and goals, I would have to produce them myself. Of course, I had anticipated this possibility in my original sabbatical proposal and built the process of producing such materials myself into the project. However, I was a bit surprised at how entirely dependent the assembly of written background materials became on materials I wrote myself, which I did to accomplish Objective #5.

The other aspect of this research into support materials is about the provision of meaningful maps. Maps are an extremely important part of the world geography course and their use and interpretation are specified in both the objectives of the course and the official student learning outcomes. I had initially hoped to be able to assemble a regional atlas of online maps that might replace the printed atlas I currently require students to use. Given that when you punch “maps” into Google you get over 1.8 billion hits, I figured the maps I needed had to be out there somewhere if I searched hard enough. This did not turn out to be true. Ultimately, it proved impossible to find a consistent set of regional topical maps online that could be used to construct a world regional atlas to provide the necessary range of background maps for the course. This led me in two directions. One was to assemble digitally available maps that may not constitute a world regional atlas, but would still support the course. This was accomplished as part of Objective #5. The other was to review commercially available published atlases, to choose the best atlas for the course. At least this got me to several tangible alternatives for consideration.

The atlas I have been using in the current-events focused world geography course is Sutton’s Student Atlas of World Geography. While there are many published general-interest atlases, most student atlases are for children and there are only several I could find that are appropriate for college-level use. I reviewed those intensively and they are listed in the documentation for this objective. All of these atlases show some degree of advantage over my current atlas. First, they all look better, that is the graphic design is contemporary and attractive. However, a lot of the attractiveness of the contemporary graphic design includes visual noise that actually makes the map content harder to read. I ultimately judged my current atlas to deliver thematic content in a clearer, easier to apprehend manner than the ones with flashier design.

Second, some of the other atlases with 2016 publication dates are more up to date than my current atlas, which has a 2014 publication date. Trying to keep as current as possible is important in a world geography course focused on current events, but I do not think the publication date differences are critical. It is reasonable to expect that a new edition of my current atlas will be published sooner than later with updated data underlying the maps. I can also expect that it will be several years before the 2016 publications are revised. I have chosen to
redress the problem of data currency through the provision of access to certain digital map and data resources, as accomplished for Objective #5.

A third consideration in evaluating the atlases was the quality of explanatory text. The National Geographic atlases in particular have some very interesting text, but it is not always directly focused on the maps and it strays further afield than what I want to cover in class. In Sutton’s atlas, the explanatory text is always directly related to the map it accompanies, allowing students to stay focused on the subject at hand. After all this exploration, I ultimately settled on continuing to use Sutton’s atlas. I am now confident, as I was not prior to the completing this part of the sabbatical, that it offers the best combination of sophistication of information with ease of use and will ultimately serve my pedagogic intentions and student learning better than other available products.

c. I spent 60 hours achieving Objective #4 as per the log provided in this report. The documentation includes a list of the atlases that were subject to intensive review.

Objective #5:

a. Develop a collection of maps and reading materials that will support a current events focus in World Geography.

b. Developing a collection of map materials for the course was accomplished by assembling references to numerous maps accessible online to my world geography students. Developing a collection of reading materials for the course was accomplished by writing them myself. As with all the materials I authored for this sabbatical, I will maintain intellectual property rights to materials as per MCC AP3715.

Constructing a collection of maps and related graphic materials that reflect current events and up to date data was accomplished in two ways. First was to comb through The Economist news magazine in both print and digital formats in search of usable graphics. The Economist is the news magazine I assign and students therefore have access to its digital resources. The online digital search tool cannot easily find maps, so I had to comb through print copies a page at a time to select relevant resources and then find them online to download them. In this way I collected 224 recent maps and charts that I can now make available to my students as related events in the world arise. An excerpted listing of the maps is available in the documentation.

To address the matter of data currency in relation to map presentation, as well as for general information background and data analysis, I identified several websites that between them offer hundreds of data charts and entries. They are noted and excerpted in the documentation.
The biggest part of this sabbatical project was the preparation of written background materials to help students understand the current events we consider in class in the context of the places in which they occur. To achieve this part of the objective, I wrote twelve regional background units consisting of 194 entries and eight topical background units consisting of 137 entries. The titles of the 20 units I wrote are listed in the documentation and some of the units and entries are excerpted there as well.

c. Achieving Objective #5 took me 255 hours as per the log provided in this report. The documentation includes the above referenced excerpts of lists of maps, websites and excerpts from the background units I authored.

IV. Contribution to District

A. Explanation of how my activities will contribute to my professional development:

The variety of pedagogical approaches and the sheer amount of information related to geography are still expanding rapidly, as they have been doing ever since the onset of the digital age. This sabbatical project has been very helpful in helping me become current regarding various changes and advances in my field. It has also, interestingly enough, taught me that in some areas, particularly regarding physical geography laboratory, I was not nearly as behind as I thought I was. The activities conducted during this sabbatical deepened my understanding and skills as both an instructor and a geographer for both Physical Geography Laboratory and World Geography. I expect my students in both classes will benefit from these improvements as I deliver higher quality instruction. I also have an improved ability to help associate faculty in my program develop their approach to geography classes.

B. Explanation of the anticipated short- and/or long-term benefits of your project on the following groups: students, department, college, and/or community. Include specific information on SLOs and/or PSLOs.

The principal beneficiaries of my sabbatical leave project will be my students. The lab exercises I authored for Physical Geography Laboratory are mostly aligned with student learning outcome 1, read, interpret and compare topographic maps. As their topographic map reading skills will be better developed, they should be able to interpret the maps more effectively as per student learning outcome 3, compare and analyze landforms in terms of their underlying geomorphological processes. Additionally, the sun chart lab will foster a more expansive ability to perform student learning outcome 2, critically interpret meteorological data. Students in my World Geography classes will get a deeper and broader grounding in the geographic background to current events and access to more specific issue-related maps. Through these things they will better achieve student learning outcome 1, use maps as information resources and analytical tools, and 2, employ a spatial perspective to analyze the interconnections between places at a variety of scales. The department will
benefit particularly through my deeper ability to transfer some of my newly gained perspectives to part-time faculty teaching these courses. Of course, as the students and the department benefit, so too will the college and the community.
### V. Documentation

#### HOURS LOGGED ON EACH ACTIVITY

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<th>OBJECTIVE #2. Physical Geography Laboratory: equipment review</th>
<th>OBJECTIVE #3. Physical Geography Laboratory: authoring lab exercises</th>
<th>OBJECTIVE #4. World Geography: resources review</th>
<th>OBJECTIVE #5. World geography: Collecting maps and authoring background materials</th>
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Sum total of hours completed for approved activities: **642**
List of printed and online resources I reviewed, and people with whom I consulted to achieve Objective #1.

Published resources I reviewed include:

Key, Douglas and Jain, Catherine; Laboratory and Field Exercises in Physical Geography, 7th ed., Fountainhead Press, 2016.
This is the most current edition of the customized lab manual published by Palomar College geographers.

This is the prior edition of the Palomar lab manual.

This is the laboratory manual published to accompany the textbook used in all physical geography lecture classes at MiraCosta College.

Christopherson is an emeritus California community college geographer with a heavy emphasis on a systems-based approach to science.

Erski, Theodore; Living Physical Geography in the Laboratory; W.H. Freeman, 2015.
This lab manual accompanies: Gervais, Bruce; Living Physical Geography; W. H. Freeman, 2105. While the textbook offers a modern approach integrating a printed text with digital resources, the laboratory manual is a more typical, straight, hard-copy approach.

Wiley publishes four different introductory physical geography textbooks, including two with authorship by the venerable Alan Strahler. This is their only lab manual. While it references some contemporary topics and geographical data collected through modern technologies, it is quite traditional in its thematic structure.


This stand-alone lab manual is apparently meant to fill the gap left by the ceasing of publication of the aforementioned Duckson book. It has greater emphases on biogeography and hydrology compared to most lab manuals.

A comprehensive lab book with some focus on field data collection in addition to the more traditional focus on data analysis.

Online resources I reviewed include:

http://www.iupui.edu/~geogdept/g108/course.htm
A series of online exercises available through the class GEOG 108: Physical Systems of the Environment Lab at Indiana University/Purdue University Indianapolis. More complete than most such exercise sets I found online.

A draft version of a laboratory manual produced by the School of geographical Sciences at Arizona state university around 2010 and made available through the Arizona Geographic Alliance. A fairly standard treatment with adjustments to localize the labs within Arizona.

http://www.physicalgeography.net/
A general information physical geography website without laboratory exercises per se, but with lots of neat diagrams that can be used to support laboratory content.

Plus numerous partial and whole online exercises that contributed to my content information overload, but not much to a vision of what to do with it all.

People with whom I consulted:

Judd Curran, Chair, Earth Sciences Department, Grossmont College, September 30, 2016.

Catherine Jain, Chair, Department of Earth, Space and Aviation Sciences, Palomar College, October 26, 2016.

Charlene Wright, Instructor of Geography, Social Sciences Department, MiraCosta College, November 14, 2016,

John Turbeville, Chair, Physical Science Department, MiraCosta College, November 16, 2016.

Larry Hernadez, Instructional Associate, Physical Science Department, MiraCosta College, December 15, 2016.
List of equipment to request in fulfillment of Objective #2.

18 Checker Plus pH testers, model HI98100, manufactured by Hanna Instruments. Approximate retail @ $41.

As explained in the body of the report, no other equipment or maps need to be ordered at this time.
Excerpts of physical geography laboratory exercises I authored:

Excerpt from Reading a Sun Chart:

All of this information for a place can be summarized on a useful graph called a sun chart. The sun chart below is for Oceanside. The **black circles** represent angles of solar elevation, with the outside circle being 0° at the horizon and the point in the middle representing 90° straight up in the sky. The angles are identified in 10° increments along the bottommost radius on the graph with tickmarks at 5° increments. Azimuths are represented by **black radii** around the graph measured in 30° increments along the outside circle with tick marks every 10° in between. The **red lines** represent the time of day measured in solar time. This is close to standard time, but it does not adjust for daylight savings time. Finally, the **blue lines** represent the paths of the sun in the sky for different days of the year measured in 30 or 31 day increments between the solstices. While this chart shows the months from December to June, it would work the same if the months going from June to December were substituted, so it really shows values for an entire year.
Reading the graph.

Look at the sun path (blue line) for June 21. It shows that the sun rises at a solar elevation of 0° (black circle) a little before 5 a.m. (red line) at an azimuth of about 62° (black radii), that is 28° to the north of due east. At about 8:45 a.m. it reaches an azimuth of due east. At 9:00 a.m. it has reached a solar elevation of 50°. At noon its azimuth is due south (180°) and its solar elevation is just a touch over 80°. The pattern reverses itself as the sun sets from there, getting back to a solar elevation of 50° at 3:00 p.m. (15h) and finally setting a little after 7:00 p.m. at an azimuth of about 298°, that is about 28° north of due west.

Now that you can read the graph, answer the following questions by circling the correct answer or filling in the blanks.

1. As the year progresses from January to June, sunrise along the eastern horizon progresses from:

   north to south  south to north  the position of sunrise does not change
2. As the year progresses from June to January, sunset along the western horizon progresses from:

north to south  south to north  the position of sunrise does not change

3. At the Spring equinox, at what time and azimuth does the sun rise?

_________________________________________________________________________________

4. At the Spring equinox, at what time and azimuth does the sun set?

_________________________________________________________________________________

5. At the Spring equinox, what is the solar elevation at noon?

_________________________________________________________________________________

6. a. At 9:00 a.m. (9h) what is the solar elevation on December 21?

_________________________________________________________________________________

   b. How many degrees lower in the sky is the sun at 9:00 a.m. on December 21 than it is at 9:00 a.m. on June 21?

_________________________________________________________________________________

7. Following the winter solstice, at about what date does the noon sun first reach a solar elevation of 50°?

_________________________________________________________________________________

8. For about how many hours is the sun at a solar elevation of 60° or higher on May 21?

_________________________________________________________________________________

Excerpt from Location Determination and Interpolation

You will use the compass/GPS location app on your smart phone to determine the latitude and longitude coordinates of four locations on campus as specified in this exercise. Then you will answer some related questions regarding direction and finding a specified location.

The four locations are indicated on the map of the Oceanside Campus Interior. As you visit each location, you should close and reopen your GPS app to reset it to ensure a more accurate reading. For each location, describe latitude and longitude using degrees, minutes and seconds. Do not forget to include N following latitude and W following longitude.
Four locations:

1. The western corner of the 1000 building.
Latitude, longitude:

2. The southern corner of the 3300 building.
Latitude, longitude:

3. The western corner of the 3500 building (at the nearby round table).
Latitude, longitude:

4. Outside the T420 building door at the round table.
Latitude, longitude:

5. From location number 4 outside T420 use your compass to look in the direction of $235^\circ$.
   What campus feature is located about 200 feet away?

Once you have determined the answers to questions 1-5, return to the classroom for further analysis of the data.
Excerpt from Relief and Intervisibility

Use the Rancho Santa Fe 7.5’ map for questions 1-5.

1. Draw a profile on the attached graph along a transect extending from the southwest corner of Sec. 34, T.12S., R.3W. to the northeast corner of Sec. 35, T.12S., R.3W. The left side of your profile should be west and right is east.

2. The transect crosses four intermittent streams (the northeasternmost one is dammed to create a small reservoir at the crossing point). Label each of the four stream valleys on the profile with an “s” below the low point.

3. Determine the vertical representative fraction, the horizontal representative fraction and the vertical exaggeration and write your answers in the appropriate places on the graph sheet.

4. Can one end of the transect be seen from the other end of the transect? yes no

5. How many streams can be seen from the highest point along the profile? ____________

Use the attached map of the Genre Wilderness to answer questions 6-9. You will need a ruler to measure map distances (round them to the nearest inch). Show your work.

You and your friends wish to spend the weekend camping in Genre Wilderness and you are considering staying at Crunk Camp on Lake Hip Hop. Before you go, you want to know if you can see the high mountains from your campsite. Albert the anarchist, who owns the tent, won’t even go if he can’t see Punk Peak.

6. What is the slope from Crunk Camp to the top of Jazz Butte?

7. What is the slope from Crunk Camp to the top of Country Mountain?

8. Is Country Mountain visible from Crunk Camp?

9. Is Punk Peak visible from Crunk Camp (or will you sleep in the rain)? Show your work.
Excerpt from Location and Direction II.

If you do not know your location, but know the direction from your location to two fixed points, you can determine your position by **triangulation**. By creating lines from the two known points using the opposite directions to those you observe, the lines will cross at your position.

2. What are the opposite directions of the following?

   a. A 64° __________________________

   b. A 264° __________________________

   c. A 330° __________________________

   d. S 42° W __________________________

   e. N 12° E __________________________

   f. A 180° __________________________

3. On the Clark Lake map, if you can see the Borrego Substation at A 303° and the Pegleg Smith Historical Marker is at A 30°, where are you?

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**Part 3. Declination:**

Magnetic declination, sometimes called magnetic variation, is the angle between magnetic north and true north. Magnetic declination changes over time and with location. Since a compass needle aligns with the local magnetic field, declination value is needed to ascertain true north relative to the compass needle.

The diagram below shows a typical declination diagram from a USGS map. It indicates that the declination for the map is 16.5° east of true north, that is, a compass needle in the area of the map pointing to magnetic north (MN) will point 16.5° east of true north.

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1. What is the magnetic declination for the Clark Lake map during what year?
The map below shows U.S. isogons (lines of equal magnetic declination) as well as isolines indicating their approximate annual change.

![Map of Magnetic Declination in the Coterminous United States](image)

2. What is the magnetic declination (degrees, direction) in:
   a. Portland, Oregon ________________________________
   b. New York City ___________________________________

3. What is the rate and direction of declination change in Portland, Oregon?
   ______________________________________________________________________

4. About what do you expect the declination in Portland to be today? Show your work.
   ______________________________________________________________________

5. About what do you expect the declination of the Clark Lake map to be today? Show your work.
   ______________________________________________________________________
List of commercially published atlases subject to intensive review toward partial achievement of Objective #4.


Partial list of catalogued maps and charts downloaded from The Economist:

20160813USTroopsAbroadMap.png
20160820SubSaharanAfricaFreedomMap.png
20160827SyriaControlMap.png
20160903ChinaXinjiang.png
20160903NigeriaBorno.png
20160903satellitesTypesMoneyGraphs.png
20160910MyanmarMilitias.png
20160917AIQuedaISDeathGraph.png
20160917ChinaTibetUnrest.png
20160917EgyptNubians.png
20160917SyriaControlMap.png
20160924AntibioticResistanceGraphs.png
20160924ChinaNuclearPowerMap.png
20160924DefenseSpendingGraph.png
20160924SyriaControlMap.png
20161001AleppoSyriaControlMap.png
20161001ChinaGDPpCMap.png
20161001ColombiaFARCMap.png
20161001NigeriaBornoMap.png
20161001RussiaHIVgraph.png
20161001UrbanTransportGraphs.png
20161001WorldRuralUrbanGraph.png
20161008AfghanTalibanControlMap.png
20161008ChinaHuiMuslimsMap.png
20161008DecliningGlobalPovertyGraph.png
20161008EuropeBlocsmembersChart.png
20161008GlobalMicrfinanceGraph.png
20161008IraqControlMap.png
20161008USRussiaNukesgraph.png
20161015EthiopiaUnrestMap.png
20161015EuropeWorkerDemographyGraph.png
20161015JapanElectricityGraph.png
20161015JapanNuclearPowerMap.png
20161015SouthAsiaGDPGrowthGraph.png
20161015SSAGDPGraph.png
20161015USMexicopostNAFTATradeGraph.png
20161015YemenControlMap.png
20161022AfricaMigrantGraph.png
20161022MeditteraneanMigrationMap.png
20161022MosulAttackMap.png
20161022RussiaPopMap.png
20161022UkraineDonbasMap.png
20161029AfricaAfarTriangleMap.png
20161029CanadaImmigrantSourcesGraph.png
20161029CanadaQoLGraphs.png
Partial list of maps and data tables indexed at the World Bank’s online atlas, http://data.worldbank.org/indicator/

- Imports of goods and services (constant LCU)
- Imports of goods and services (current LCU)
- Imports of goods and services (current US$)
- Imports of goods, services and primary income (BoP, current US$)
- Industry, value added (% of GDP)
- Industry, value added (annual % growth)
- Industry, value added (constant 2010 US$)
- Industry, value added (constant LCU)
- Industry, value added (current LCU)
- Industry, value added (current US$)
- Inflation, GDP deflator (annual %)
- Inflation, consumer prices (annual %)
- Insurance and financial services (% of service exports, BoP)
- Insurance and financial services (% of service imports, BoP)
- Interest payments on external debt (% of GNI)
- Interest payments on external debt (% of exports of goods, services and primary income)
- Machinery and transport equipment (% of value added in manufacturing)
- Manufacturing, value added (% of GDP)
- Manufacturing, value added (annual % growth)

The CIA World Factbook is perhaps the single most authoritative source available online for almanac-style information about all the countries of the world. It can be accessed at https://www.cia.gov/library/publications/the-world-factbook/. Topics addressed in detail for every country of the world are:

- Geography
- People and Society
- Economy
- Energy
- Communication
- Transportation
- Military

Gapminder is a wonderfully engaging and informative site offering many interactive analytical mapping and charting tools generally based on the most up to date data available. They are found at http://www.gapminder.org/.

They offer hundreds of world geography related topics that can be displayed in a variety of ways or even dynamically compared.
List of written background materials I authored myself.

Topical backgrounds:

Demography
Economics
Environment
Geographic Concepts
Globalization
News Bias
Politics
Religion

Regional Backgrounds:

Australia and New Zealand
Caribbean
Central Asia
East Asia
Europe
Latin America
Russia Plus
South Asia
Southeast Asia
Southwest Asia and North Africa
Sub-Saharan Africa
United States and Canada
Excerpt from Background: Politics

Background: Politics

Politics: The practice of government. How some people get to decide what lots of other people have to do and how they make those decisions stick.

Geopolitics: Politics as a spatial process at any scale that considers and manages geographical factors including the influence of location and spatial patterns, and the division of political space. At the global scale, the term is sometimes over-stretched to be synonymous with international relations.

State: A sovereign governmental organization with jurisdiction over territory; what we usually mean by calling a place an independent country. It is the principal regional unit of global geopolitical organization and dominates the exercise of political power in today’s world. The United States of America is a state. The fact that Americans also refer to the subdivisions of our state as states, for example California, is a historical peculiarity of the way the original thirteen colonies became independent and then confederated.

Nation: A group with cultural factors in common, such as language, religion, or historical foundations, that generally provide group members with their highest, most significant form of group identity. Ethnicity and nationality are defined similarly, although an ethnic group is generally a minority in the place it is found while a nation is the majority in the place in which it is found.

Nation-state: The original conceptualization of the modern state in which a culturally coherent nation is organized into a sovereign state. Most states today are multi-ethnic, rather than single-nationality, even when a single nationality is predominant.

State-nation mismatch: Based on language alone, there are thousands of nationality groups in the world, but there are currently only about 195 states. Clearly, most nations do not have a state of their own and the territorial alignment between states and smaller nations is poor. This often induces political tension and instability in the state as ethnic groups struggle to have their political interests met.

Language: A system of communication that stores and expresses a particular culture and thus serves as the most common basis of national or ethnic identity.

Religion: A system of belief and values that may broadly encompass other aspects of culture and thus may serve as an organizing principle of national identity that sometimes is more significant than language.

Identity politics: An approach to politics in which the perceived political preferences of ethnic groups or other culturally defined groups (e.g. women, gays, working class, etc.) take precedence over political philosophies or problem solving.
Excerpt from Background: Europe

Background: Europe

Europe as a culture region: The principal linguistic, religious, economic and political characteristics that define Europe today are Indo-European languages, Christian religions, wealthy free market economies and democratic political systems. These can be further delineated in relation to three principal subregions of Europe: southern Western Europe, northern Western Europe and Eastern Europe.

Euro-: 1) A prefix indicating Europe or European culture (e.g. Eurocentrism, a European-biased perspective). 2) The currency of the Eurozone (see below) within the European Union. It is symbolized €.

Indo-European language: The predominant subfamilies of the Indo-European languages in Europe are Romance in southern Western Europe, Germanic in northern Western Europe and Slavic in Eastern Europe, but in several countries other types of language are spoken.

Christianity: Although Christianity originated in the Levant, in its first 1500 years it diffused most successfully within Europe and then diffused around the world from there over the last 500 years of European-led globalization. The three predominant subtypes of Christianity are all European. Catholicism predominates in southern Western Europe in association with Romance languages, but as the original widespread church it is also prevalent in southern Germanic lands and northern Slavic lands. Protestantism predominates in northern Western Europe in association with Germanic languages. Eastern Orthodoxy originated and remains among Greeks, but it predominates in Eastern Europe in association with southern and eastern Slavic languages.

Wealth: The economies of Western Europe have grown extremely wealthy through free market capitalism, with northerners somewhat better off than southerners. The economies of Eastern Europe are wealthy by global standards, but significantly less wealthy than in Western Europe. This is due first to physical and cultural distance from the hearth of European industrialization and more recently to being hamstrung by decades of communism.

Democracy: Most Western European countries have been democratically governed since WWII, although several (including Greece) remained dictatorships into the 1970s. Eastern European countries remained communist until the end of the Cold War in the late 1980s and, for the Baltic Republics, until the fall of the Soviet Union in 1991.