



Course Syllabus - *The Sea Around Us*

GEOSC 040 (3) GN
Spring 2004

Penn State Delaware County

Instructor: Dr. Laura A. Guertin

Office: CLASS 102

Email: uxg3@psu.edu

Office phone: (610) 892-1427

Web site: <http://cms.psu.edu/> (ANGEL)

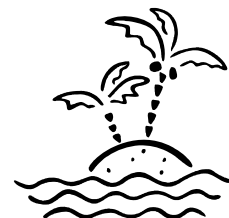
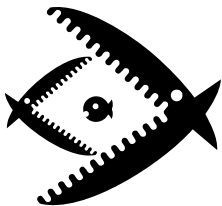
Office hours: 2:30PM–5:30PM Mondays (office) and Wednesdays (office/library)

Lecture: 1:30PM – 2:20PM Mondays and Wednesdays in CLASS 101

Lab Sec. 001: 1:30PM – 3:20PM Fridays in CLASS 101

Textbook: *The Oceans*, by Prager and Earle (McGraw-Hill, 1st edition, 2000), plus supplemental readings available in ANGEL each week

What's in store for you... For the majority of you enrolled in GEOSC 040, this is your first true introduction to oceanography! There are no prerequisites for this course, all you need is an open mind, and you will learn things about the oceans you never knew before. Stay tuned, and find out why our planet is referred to as the "Blue Planet!" You will gain insight into the formation and structure of the oceans, inside and out. Learn about coasts, and the effects of waves and tides. Get the scoop on marine life, plate tectonics and ocean basins. We'll examine sunny shorelines at the shore. And of course, we'll be focusing on the local coast and coastal issues.



FIELDTRIP!!!!

This course has one REQUIRED fieldtrip to Cape Henlopen State Park in Delaware (approx. 2 hours away from campus). The required field trip will take place on a Saturday for a full day. You are assigned to go early in the semester (Saturday, January 31st) or later (Saturday, April 17th). The fieldtrip will involve collecting field data using a technique called beach profiling. Data will be compared from the two field dates, and you will write a scientific report of our investigation to hand in at the end of the semester. If you do not go on the fieldtrip or forget to show up on your field date, you will not be allowed to complete the final paper and you will receive a grade of “zero” for the field project (which is 25% of your final grade).

The following students will be attending the January 31st fieldtrip (leaving campus 8:00AM, returning to campus 4:00PM): Ballard, Barnett, Bishop, Brenner, Bristol, Carrillo, Digregorio, Farmer, Figueroa, Flint, Goldson, Heraty

The following students will be attending the April 17th fieldtrip (leaving campus 10:30AM, returning to campus 6:30PM): Impriano, Ionno, Jennings, Jeon, Kline, Lucey, Makatche, Miller, Park, Reese, Takos, Watson-Sh., Watson-St.

*For those students who add this course after the first day of classes, you will be attending the fieldtrip on the date for the person who dropped the course (so you will be taking someone’s existing space). I will notify you of the date when you are enrolled- there is no negotiating which date to attend.

COURSE GOALS!!!!

I realize that 99.9% of the students that take my geoscience courses will never become professional geologists. This is why I design all my courses around skill-based goals, where you will acquire and/or further develop skills that will be applicable to you no matter what your future career.

- **The scientific method and working with data sets:** You will be developing hypotheses, collecting and processing data, then checking your results and discussing your research in a written report.
- **Using technology:** You will be working with Microsoft Office and Palm Pilot handheld computers throughout the semester to prepare you for the technology-focused world of employment.
- **Sharing your knowledge with others:** For the rest of your lives, you will always be a student and a teacher. You will also learn the course material better if you explain it to others in and outside of class. There will be a service project required for you to share your new oceanographic knowledge. This semester we will be targeting...



Details to follow later in semester!

Now for all the necessary, important information....

My expectations of you...

I expect every student to come to every class and lab session on time and ready to go. You should have read the corresponding chapters and readings in ANGEL for each lecture BEFORE coming to class. Be sure to bring something to write with and your calculator to every lecture and lab session. I encourage everyone to ask questions and work with your fellow students in lecture and lab.

- **Class Participation**

Class participation is required! This course is to be an interactive course, filled with questions, discussions, stories on your favorite ocean experience, etc. There is much we can learn from each other! Although I will be lecturing during much of this course, what you will be doing during class time is a vitally important aspect of how you will learn in this course – whether you be an “active” participant or just come to class and be a “passive” participant. You will also be working in groups during the lecture and lab periods, which places on you serious responsibility to other students in the class. **ATTENDANCE IS STRONGLY ENCOURAGED**, and I will be looking for your presence at every class meeting. I will make exceptions when missing lab or a quiz for legitimate emergencies when I am **notified AHEAD OF TIME** (such as health, family emergencies, etc.). If you miss lecture for any reason, I will expect you to get in touch with me ASAP and make up all the work that you missed *before* the next class meeting. **If you miss a lab period *without* giving me prior notification, I will deduct two points from your final average at the end of the semester.** Waiting to notify me the next week is too late – I need to know the day of BEFORE the lab period. You will also be responsible for getting in touch with a fellow student to find out and make up the work that you missed.

- **Classroom Etiquette**

Let's work together on this one. Please do not have conversations going on with other students while I am lecturing. No passing notes, no reading the newspaper. **If I find that anyone is being too disruptive to too disrespectful to the students or myself, I reserve the right to dismiss you from the classroom.** You will then have to speak to me in my office before I will allow you back into my classroom. **NO FOOD OR BEVERAGES ARE ALLOWED IN CLASS 101 OR ANY COMPUTER ROOMS.** This is school policy, not just mine. We'll be working with computers and many materials that cannot have any food or drink near them. **DO NOT SIT** in the last three rows of the classroom – there are plenty of seats for everyone in the middle and up front. And **do NOT get up and leave the room while I am lecturing.** We will be having class discussions where I want you to volunteer your interpretation and opinion on certain oceanographic issues. Be open, be honest, and show respect for the opinions your fellow students have. The class will be much more enjoyable if we show respect for one another!

- **A note on cell phones:** There is no reason a cell phone should be going off in lecture. I can't tell you how disrespectful that is to have a cell phone

interrupt me while I am lecturing. Turn your cell phones off before lecture/lab begins. If your cell phone goes off during my lecture, I will dismiss you from the rest of class.

In a nutshell, it's all about respect!!! I demand respect in my classroom – respect towards me, respect of students to students, and myself respecting the class. I will not tolerate disrespect in class, and neither should you!

- **ANGEL and email**

ANGEL will be used much in this course. If you are not familiar with ANGEL, please set up an appointment with me ASAP so I can sit down with you and show you how to most effectively use Penn State's course management software. There will be several folders and links for you to access relating to various class discussions and assignments. The most "complex" use of ANGEL is where you will need to know how to download Microsoft Excel files that I post, enter data, and then place the Excel files in a dropbox folder I set up. Trust me, you will not survive this course if you don't use ANGEL.

You must access your Penn State email as well. PSU email is the designated form of official communication between Penn State faculty and their students. I will be making use of email as reminders for deadlines, follow-up to classroom discussion, clarification on assignments, etc. I will not send useless messages – only ones that directly relate to the class and to assist your learning. All emails I send to the entire class at once will be done through the ANGEL email system.

Please believe me when I say that I have never had a student pass my course that has not used ANGEL and/or their Penn State email address – not because I have intentionally failed them, but they did not take advantage of these technological tools and missed out on critical course materials. I'm not trying to scare anyone, but I am serious about this. ANGEL and email will put the power and control of your learning in your hands

- **Math**

Yes, folks, this is a science course, so there will be some math involved. But the math skills I'm expecting are basic. You should be comfortable with the following: graphing, unit conversions, setting up and solving ratios, and percentages.

- **Palm Pilots**

You will be given Palm Pilot handheld computers to use during most lecture and laboratory sessions. You will be assigned a specific Palm Pilot that you will pick up from me at the beginning of lecture/lab and return at the end of class. Training will be given on how to use the Palms during the second week of class. Please treat these Palms with respect – do not change any formats, move or delete files, etc. If I find that you have intentionally changed anything on a Palm, you will **IMMEDIATELY** lose the right to use a Palm the remainder of the semester. (***) Keep in mind that most of your labs and the field project will be on the Palms... you lose your Palm

privileges, you will forfeit the right to participate in all remaining labs and complete any other assignments/projects with them!)

- **Late Assignments**

All assignments must be turned in **on time** – otherwise, 10 points will be deducted from the assignment grade for being late and every day it is late. For example, if an assignment is due 1:30PM on Monday, if it is handed in on Monday but after 1:30PM, 10 points will be taken off, then an additional 10 points if it is handed in on Tuesday, etc. Do not use “computers” as an excuse for not turning in an assignment on time (such as the disk ate my paper, I couldn’t log in from home, etc.).

- **Final Exam**

Yes, we will have an open note, open book cumulative final for this course. The final will not be your traditional multiple choice exam. The questions will be broader in scope and your responses will be in essay form. You will receive sample exam questions the last day of classes. The final is not optional. If you do not show up for the final, you will receive a grade of zero for the exam. It is your responsibility to remember the day and time of the final (listed in this syllabus).

What you can expect of me...

I will be prepared every day with a full lecture and will start on time. I will keep you updated if there are to be any changes to the syllabus (for example, if the class wants to explore a topic further, I will be flexible!). I will make myself available during and outside of class to answer any question you may have – don’t hesitate to ask anything! I will not only teach you “the material” but why we are learning it, the applicability of this course to your everyday lives. After approximately the first month, I should have all of your names memorized and I will recognize you by name during class discussions. I will not give any makeup assignments, for this is not fair to everyone that is ready to participate in class and hand in everything on time. If you have a medical/family emergency and cannot come to class for a lab or to hand in an assignment, contact me **PRIOR** to see if there is a way to make up for missed work (please note that there are some in-class exercises where it will not be possible to make up the work).

In the end...

You must have fun in this course! I give you my word that I will put as much effort and energy into this course as I possibly can, to make this an enjoyable semester for you. In return, I hope you come to class with a positive attitude and open mind to new ideas and topics!

Note to students with disabilities

Penn State does not discriminate against qualified students with documented disabilities in its educational programs. If you have a disability-related need for modifications in this

course, contact Sharon Manco, 610-892-1461, 203A Main. This notification should occur by the end of the first week of the semester.

Grading

Your grade for the semester will be based on quizzes, lab exercises, three science projects, a community service project, and the final exam. The breakdown is as follows:

Grain-Size Analysis Project – 15%

Hurricane Project – 20%

Field Project in Cape Henlopen – 25%

Service Project (Absolutely Incredible Kid Day) –endangered/extinct species – 15%

Misc. Quizzes – 15% (plagiarism, syllabus, two others)

Final Exam – 10%

The final grades will be assessed at the end of the semester as follows:

A = 96 to 93; A- = 92 to 90; B+ = 89 to 87; B = 86 to 83; B- = 82 to 80;

C+ = 79 to 77; C = 76 to 70; D = 69 to 60; F = 59 and below

**** Do not expect me to drop any grades or curve any grades during or at the end of the semester. Extra credit is NOT available in this course.***

Academic Integrity

All students are expected to act with civility, personal integrity; respect other students' dignity, rights and property; and help create and maintain an environment in which all can succeed through the fruits of their own efforts. An environment of academic integrity is requisite to respect for self and others and a civil community.

Academic integrity includes a commitment to not engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty include cheating or copying, plagiarizing, submitting another persons' work as one's own, using Internet sources without citation, fabricating field data or citations, "ghosting" (taking or having another student take an exam), stealing examinations, tampering with the academic work of another student, facilitating other students' acts of academic dishonesty, etc.

Students charged with a breach of academic integrity will receive due process and, if the charge is found valid, academic sanctions may range, depending on the severity of the offense, from F for the assignment to F for the course.

The University's statement on academic integrity, from which the above statement is drawn, is available at: <http://www.psu.edu/dept/oue/aappm/G-9.html>

OK, so **WHAT DOES THIS ALL MEAN... DO NOT EVEN THINK OF CHEATING!!!** Do not copy off of your fellow students, do not plagiarize (from books, the internet, from yourself, etc.). I will vigorously pursue any suspicions I have of academic integrity violations! If I suspect a violation, I will first have an informal conversation with you to discuss the issue. Then, depending on the outcome of that conversation, I will have another conversation with you that requires us both to sign an academic integrity report form that will be turned in to the campus academic integrity committee. I will determine what I feel is appropriate punishment for your violation of PSU's academic integrity policy. The sanction may be from failing the assignment to failing the course, depending on the severity of the violation. We will be reviewing academic integrity and plagiarism the first week of the semester, and you will have a quiz on academic integrity and plagiarism the second week of the semester.

Breakdown of topics covered during each class meeting

** note that this syllabus is subject to change with prior notification*

****** note that every Friday is our lab period. We meet from 1:30-3:20PM. Please do not ask me if we will be getting out "early" – the answer will be "No" each and every week.

Readings are to be completed BEFORE coming to lecture. Readings will also be placed in ANGEL – it is your responsibility to check the folders in ANGEL corresponding to each week for the readings.

Week 1 (see links in ANGEL for additional readings)

M, 01/12: Introduction – where did the oceans come from??? (text, p. 3-22)

W, 01/14: Heroes in the history of oceanography and in the present (text, p. 65-71)

F, 01/16: Dr. G at a meeting, plagiarism lecture (link in ANGEL or on CD on reserve in library, complete Part I of Plagiarism quiz, place in dropbox no later than 1:30PM

Monday 01/19)

Week 2 (see links in ANGEL for additional readings)

M, 01/19: Palm Pilot training, **QUIZ**: plagiarism (Part I of quiz should be in ANGEL dropbox by 1:30PM)

W, 01/21: Plate tectonics (text, p. 141-162), **QUIZ**: syllabus

F, 01/23: Sediment Grain-Size Lab, **ASSIGN**: Grain-Size Analysis Project

Week 3 (see links in ANGEL for additional readings)

M, 01/26: Wind and waves (text, p. 78-105)

W, 01/28: Tides (text, p. 109-113)

F, 01/30: in computer lab 202 Commons, create tidal graph for field site (must show me completed work before you leave lab in MS Excel) – recommend bringing a disk to save your work, this graph will go in your Cape Henlopen Report

Saturday, 01/31: FIELDTRIP #1, Cape Henlopen State Park, DE

Week 4 (see links in ANGEL for additional readings)

M, 02/02: Beach processes and erosion

W, 02/04: in computer lab 202 Commons, generate profiles, **DUE**: Grain-Size Analysis Project

F, 02/06: Dr. G at a meeting, finish creating graphs, details in ANGEL folder for Week 4 about next week's quiz

Week 5 (see links in ANGEL for additional readings)

M, 02/09: Hurricanes (text, p. 115-140), *SHOW Dr. G graphs from Week 4, **QUIZ**: beach erosion (see Week 4 folder in ANGEL for details)

W, 02/11: Hurricanes

F, 02/13: in computer lab 202 Commons, hurricanes exercise, **ASSIGN**: Hurricane Project

Week 6 (see links in ANGEL for additional readings)

M, 02/16: Life in the oceans (text, skim p. 187-265)

W, 02/18: Life in the oceans

F, 02/20: in computer lab 202 Commons, exercise on invasive species

Week 7 (see links in ANGEL for additional readings)

M, 02/23: Marine mammals (text, p. 231-239)

W, 02/25: Whales and *The Essex*

F, 02/27: exercise on whales and SONAR

Week 8 (see links in ANGEL for additional readings)

M, 03/01: Dolphin-safe tuna (... or is it?), *BRING a can of tuna to class

W, 03/03: U.S. Navy Marine Mammal Program

F, 03/05: in computer lab 202 Commons, **DUE**: AIKD Project (by 5PM)

M, 03/08: SPRING BREAK – go to the beach!

W, 03/10: SPRING BREAK – go in the ocean!

F, 03/12: SPRING BREAK – build a sand castle!

Week 9 (see links in ANGEL for additional readings)

M, 03/15: video segment from The Blue Planet – marine mammals

W, 03/17: Oil spills (see ANGEL for readings), **DUE**: Hurricane Project (by 5PM)

R, 03/18: No class, but don't forget... today is *Absolutely Incredible Kid Day!*



F, 03/19: debate on drilling in National Arctic Wildlife Refuge (read material in ANGEL before lab – will not be available during lab)

Week 10 (see links in ANGEL for additional readings)

M, 03/22: Oil spills – and how to clean them up

W, 03/24: Dr. G at meeting (virtual lecture – see ANGEL and/or library reserve)
F, 03/26: Dr. G at meeting (virtual lecture – see ANGEL and/or library reserve)

Week 11 (see links in ANGEL for additional readings)

M, 03/29: maps to evaluate environmental tradeoffs from an oil spill, **QUIZ**: (see Week 10 folder in ANGEL for details)

W, 03/31: maps to evaluate environmental tradeoffs from an oil spill

F, 04/02: nautical charts

Week 12 (see links in ANGEL for additional readings)

M, 04/05: nautical charts and tsunamis

W, 04/07: Tsunamis

F, 04/09: Tsunami “gallery walk”

Week 13 (see links in ANGEL for additional readings)

M, 04/12: Sharks (text, p. 222-230)

W, 04/14: The Giant Squid and other deep-sea creatures (text, p. 218-222)

F, 04/16: “freaks from the deep” and deep-sea research ethics

Saturday, 04/17: FIELDTRIP #2, Cape Henlopen State Park, DE

Week 14 (see links in ANGEL for additional readings)

M, 04/19: fieldtrip grain-size analysis

W, 04/21: fieldtrip grain-size analysis

F, 04/23: in computer lab 202 Commons – finalize profile data

Week 15 (see links in ANGEL for additional readings)

M, 04/26: Florida Keys (text, p. 267-277)

W, 04/28: the future of our oceans (text, p. 279-297)

F, 04/30: a “political” exercise with El Niño and global warming (text p. 123-140), **DUE**:
Cape Henlopen Project

FINAL EXAM (cumulative, open note, open book) will be
Wednesday, May 5th 12:30PM - 2:20PM

Virtual Lectures

I will be missing some lectures this semester while I attend professional meetings. Instead of giving you “busy work” to do in my absence, I have recorded lectures for you to watch that would fill a typical class period. So instead of coming to class, watching my PowerPoint and seeing me speak, you’ll be able to watch the PowerPoint and hear me speak on the computer!

I have recorded the lectures I would have typically given during the class periods I am away. There will be a folder in ANGEL titled "Virtual Lectures" that contains a link to this online lecture and instructions on how to access. I recommend you take notes while watching this lecture just as if you were in class. There will be a quiz the next class meeting after the Virtual Lectures are assigned.

The Virtual Lectures can be watched in the following browsers:

- Internet Explorer 5.0 or later for Windows
- Internet Explorer 5.2.2 or later for Mac OS X
- Netscape Navigator 7.0 or later for Windows

Netscape Navigator will only work on the Mac if you install Windows Media Player.

There will be several ways to access these lectures (note that you will need to hear the sound for the complete lecture (speakers on home computer or use of headphones on campus):

- **From any campus computer**, log into ANGEL, read instructions in folder and watch. For the computers in Vairo Library, the circulation desk has 3 or 4 headphones for you to use. The PC's **MUST** use headphones since the speakers have been disabled. You can bring your own headphones to use with these computers (our campus bookstore also sells headphones). Both library PC computer labs (near the circulation desk and back by Room 201E) support audio w/headphones. Both Internet Explorer and Netscape 7.1 can be used with the lecture. If you want to use a Macintosh computer, you need to use Internet Explorer **ONLY** (Netscape will **NOT** work). The Macs in 201E Vairo Library support headphones.
- **From any home computer with a DSL (fast connection)**, log into ANGEL, read instructions in folder and watch and take notes.
- **If you have dial-up from home (slow connection)**, the Virtual Lecture *may* take much too long to load. I suggest trying from home to see if the lecture loads in a reasonable amount of time. **BUT**, if you cannot access the lecture from home, then you are encouraged to use one of the campus computers, or sign out a CD on reserve in the library with the lecture (but there are extremely few copies on reserve).
- **If you do not have internet connectivity from home**, you'll need to either sign out a CD on reserve in the library with the lecture (but there are extremely few copies on reserve), or watch the lecture on a campus computer.

Note that you **MUST** view the lecture. Here I've presented several options for watching the lecture - there will be no excuses or reasons for not accessing the lecture before our next class meeting. **YOU ARE STRONGLY ENCOURAGED TO USE OUR SCHEDULED CLASS MEETING TIME TO ACCESS THE LECTURE ON A CAMPUS COMPUTER.** Remember that you can start-and-stop the lectures at any point – you do not need to sit down and watch the entire lecture at once. You can also go back to specific slides and review the information presented.

How to Write a Scientific Paper in Dr. G's GEOSC/EARTH Courses

In GEOSC 040 this semester, you will be writing three scientific reports - one for the grain-size analysis project, one for hurricanes, and one for the Cape Henlopen State Park project. Use this as a general guide to prepare your write-ups. Note that you will be provided with the grading outline for each project when the project assignment is given.

Each project is based on your use of the scientific method. For some of your projects, I will be grading the **QUALITY** of your hypothesis. Make sure you put some time and thought into developing a hypothesis. For example, a “bad” hypothesis would be: *streamflow increases down the Mississippi River*. This would be just a modification of what is discussed in class – not very original. Make sure your hypothesis is a testable statement, not in the form of a question. Another “bad” example would be: *does streamflow change in the Mississippi?* For this one, how would you define “change”? Where would the “change” take place? Be sure that your hypothesis is a specific as possible for what you will be testing. Make sure you are only testing one hypothesis, not multiple ones in the same statement: *streamflow increases in the Mississippi, and snowfall is heaviest in Mississippi in December*.

- Your report should be as long as it needs to be in length, typed, double-spaced, and in 12 point Times New Roman font. Number the pages in the upper right-hand corner, beginning with the Introduction as page one. Carefully proofread your paper for spelling and grammatical errors. **Do not use personal pronouns such as “I” or “we.”**
- Start with a **Title Page**. Choose a title that reflects the topic and clearly communicates the investigation (do not use “cute and catchy” titles). Your title page should have the title centered in the center of the page. In the center towards the bottom of the title page, include your name, Penn State University Delaware County, GEOSC 040 – The Sea Around Us, and the date the paper is due. See the page towards the end of this handout for an example title page. There is no page number of the first page.
- Begin the paper with the **Introduction**, and label this section as such. This is where you introduce the specific subject of the experiment. This is where you explain in detail the hypothesis, and how and why it was developed. This is where you reference your map of the field area (if applicable). Here is where you would also include some background information about the subject you are researching.
- The next section is labeled **Methods**. Here is a step-by-step description on how the investigation was conducted. Where is the field site? How did you get there? What

did you do there? What type of data did you record (keep in mind that you do not discuss any of the actual data until the next section!). If you use a pre-existing data set, this section is where you would include a discussion of the data you used, how/where you obtained it, what you did with it, etc.

- The next section is labeled **Results**. This is where the actual data collected is presented in text, and/or in a figure, and/or in a table. You should have a paragraph that describes the data but does NOT interpret it.

A Note on Figures, Graphs, and Tables

- Make sure each figure/graph has a caption or label across the bottom, just like you see in your textbook. The caption should be meaningful and relate to the figure. For a table, the table heading goes across the top and should clearly describe the content in the table.
 - All figures/graphs/tables should be numbered in sequential order (Figure 1, Figure 2, etc.), placed in your report in sequential order (do not put Figure 10 before Figure 7), and referred to in sequential order (do not point out data in Figure 4 before introducing Figure 3).
 - Figures/graphs/tables should either be contained on a page within the text of a document or on a separate page. If on a separate page, the figure/graph/table should be the page immediately after the page that first refers to that figure. For example, say Page 1 is, “blah, blah, blah, (Figure 1). Blah, blah, blah (Figure 2). Blah, blah,…” Then Page 2 in the document must be Figure 1, and Page 3 in the document must be Figure 2. Then you continue with your text “blah” on Page 4.
- The next section is the **Discussion**. This is where you actually interpret and discuss the data. In the previous section, the data is “laid out.” Here is the comparison of the data to the original hypothesis. If the hypothesis is supported, clearly show how and state so. If the hypothesis was not supported, include some discussion as to possibly why it was not and suggest alternative hypotheses, and maybe what additional data you would need to collect to continue the investigation. Even if your hypothesis was supported by the data, make recommendations for future studies and how future research can expand on the foundation that you have developed with the experiment.
 - End with a **Conclusion** statement or two. Here is where you make some statement that tries to incorporate all that you have learned from this project. This of this section as the “take-home message,” what you want people to remember the most after reading this report.
 - Include a **Reference** section if you used any materials (such as your text) to supplement your report. Follow the formats that we’ve used all semester (check the Plagiarism folder in ANGEL).

An example of how to write up a Results section, how to present your graph, what to include in your Discussion section, and how to write a Conclusion

Let's say you are testing the hypothesis: ***There are more red M&M's than any other color in a bag of M&M's.*** Your introduction would include how/why you developed this hypothesis to test (why you chose to work with M&M's, why you are focusing on the color red, etc.). Your methods would describe how you collected the data (went to a specific store on a specific date, bought a 14-oz. bag of M&M's, on a certain date and location counted them out by dumping the entire bag out then separating by color, then with pen-and-paper tallied each color, etc.).

RESULTS

There are a total of 200 M&M's in the bag purchased. The colors represented in the bag include red, green, orange, yellow, brown, and blue. Twenty-five (12.5%) of the M&M's are red. Fifteen (7.5%) of the candies are green. Orange is represented by ten (5.0%) of the M&M's, and yellow is seen in 75 (37.5%) of the M&M's. Brown and blue are counted on 25 (12.5%) and 50 (25.0%) of the M&M's, respectively. Figure 1 shows a graphical representation of the data.

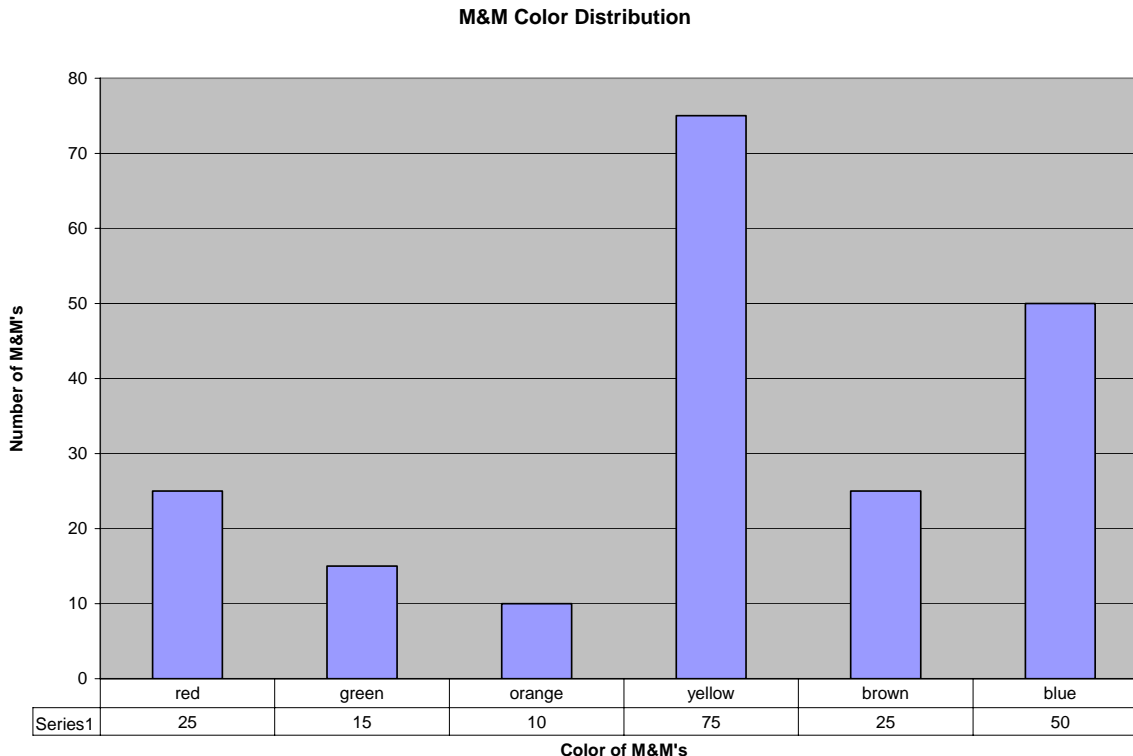


Figure 1. The number of M&M's from one bag shown by color. A total of 200 M&M's were counted for this investigation.

DISCUSSION

The original hypothesis stated that there are more red M&M's than any other color in a bag of M&M's. An examination of the data shows that this hypothesis has been proven false. Figure 1 shows that the highest number of colored M&M's in the bag tested are yellow at 37.5% of all the M&M's. The color red tied with brown for the third most abundant color in the bag of M&M's at 12.5% each. Perhaps the reasoning behind this hypothesis, that red is the most popular color of all M&M's, is flawed. A more testable reason needs to be given for this hypothesis, for the only person that feels red is a popular color is the author of this paper. To do further tests with this same hypothesis, perhaps one could purchase more than one bag of M&M's to see if the color distribution is the same in all bags – one sample is not enough data to say with confidence the answer to the hypothesis tested. It would also be interesting to see if the number of red colored M&M's stays the same throughout the year. With holidays that focus on the color red such as Valentine's Day and Christmas, maybe the candy company adds more of these holiday-colored candies. To find out how the colored candies are placed in each bag, one could also directly contact the M&M/Mars candy company and ask how they determine the color distribution for their packages.

Since the author of this paper feels that red is the most popular color of M&M's, a new hypothesis could be developed that tests whether red is the most popular color among M&M consumers. A survey could be conducted of people of various ages and at various locations to see what their favorite color M&M is and why.

CONCLUSION

The hypothesis ***there are more red M&M's than any other color in a bag of M&M's*** has been proven false from this experiment. Red tied as the third most abundant color in a bag of M&M's. Additional tests and a larger data set needs to be obtained to further test this hypothesis.

*** NOTE: The graph was created in Microsoft Excel, then copied into MS Word so that the caption could be easily added underneath. If you are not familiar with graphing in Excel, you should make an appointment with me ASAP so that I can go through how to do this. It is VERY EASY to create graphs and copy them into Word, but you should not wait until the last minute to ask for assistance.

My Meaningful, Original Title That Can Be
in a Bigger Font That Clearly Conveys
What The Paper Is About But is Not Too
Long Like This Title

Your Name
Penn State University Delaware County
GEOSC 040 – The Sea Around Us
Month X, 2004

General Grading Scheme for Investigations

(*** note that you will be provided the exact grading scheme for each project ahead of time)

The report will not be accepted late under any circumstances. Everyone starts with an average score of “3” for each category. Your score will be adjusted to how complete or incomplete your summary and descriptions are. You will receive a ZERO for the entire assignment if it is not turned in by the deadline, or if there is any bit of plagiarism.

Introduction

1 2 3 4 5

- is the background explained so someone that did not participate in this project understands what was done?
- is the hypothesis clearly stated, and how it was developed and why?
- is a map included that clearly lays out the field sites?

Quality of Hypothesis

1 2 3 4 5

- is it original? Challenging?

Methods

1 2 3 4 5

- are the methods detailed enough so that someone not in the class could go and carry out this same procedure?

Results

1 2 3 4 5

- is the data summarized somehow so it all makes sense and is easy to follow? In other words, is the data presented in some type of table or graph or figure, not just reproduced as the data sheet you used in the in the field?
- are the interpretations left out of this section?

Discussion

1 2 3 4 5

*** *this section counts DOUBLE in the end!* ***

- are the interpretations included in this section?
- are their reasons as to why or why not the hypothesis was supported?
- are alternative hypotheses suggested?
- is a future direction of this project suggested?

Conclusion

1 2 3 4 5

- is the end statement clear?
- is their a concise statement supporting the hypotheses and a memorable take-home message?

Directions

1 2 3 4 5

- did you follow them? Typed? Title page? Double spaced? References?

The scientific lab report is based on a total of 40 points