



Course Syllabus - *Environment Earth*

EARTH 100 (3) GN
Summer 2005

Penn State Delaware County

Instructor: Dr. Laura A. Guertin (aka "Dr. G")

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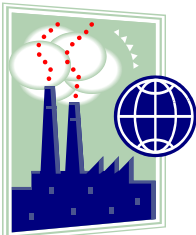
Office hours: by appointment

Lecture: 9:00AM – 12:30PM M/T/W/R in CLASS 101

Textbook: *Taking Sides: Clashing Views on Controversial Environmental Issues*, by Easton (11th edition, McGraw-Hill, 2005); other readings in ANGEL

What's in store for you... For the majority of you, this is your first true scientific introduction to environmental and Earth science! There are no prerequisites for this course, all you need is an open mind, and you will learn things about Earth's "hot topics" you never knew before. Stay tuned, and find out biodiversity and sustainability. You will gain insight into food and population issues. Learn about the debate with global marine fisheries and environmental racism. Get the scoop on nuclear power, and find out what's going on with the new nuclear waste storage facility in Yucca Mountain. Let's not forget what an important conflict is taking place in the Arctic Wildlife Refuge. We'll examine how Earth and the environment have been portrayed in politics and the media – accurately and erroneously.

Dr. G's philosophy on higher education: *Students are responsible for their own learning!!!***** I am here to help facilitate your science education to the best of my ability, but you must do your part as well. It is up to YOU to come to class, to take notes, to ask questions, to complete assignments and readings by deadlines, to be an active learner! It is up to YOU to take advantage of the education I am providing you. It is your choice to sink or swim in this course. Remember, I can expect 2-3 hours of work outside of class for every hour you spend with me in class. That means in this summer course, you will be working every night for several hours to complete your required work. Remember, this is an entire semester course packed into three weeks!



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. This is especially true in this EARTH course.

- **The scientific method and working with data sets:** You will be learning about the methods of science and participating in class activities and assignments that require critical thinking and analyzing science issues with various forms of scientific data.
- **Using technology:** You will be working with Microsoft Office and handheld technology 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 knowledge of the campus environment with students on campus in wheelchairs.

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

My expectations of you...

I expect every student to come to every class 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. I encourage everyone to ask questions and work with your fellow students in lecture. There will not be traditional assignments in this class. Your attendance and participation will strongly impact your performance and thereby your resulting grade.

- **Class Participation**

Class participation is required! This course is to be an interactive course, filled with questions, discussions, stories on your favorite dinosaur 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 some lecture periods, which places on you serious responsibility to other students in the class. **ATTENDANCE IS REQUIRED AT EVERY SESSION IN THIS 3-WEEK COURSE**, and I will be looking for your presence at every class meeting. If you have a legitimate emergency (such as health, family emergencies, etc.), get in touch with me ASAP. You will be responsible for getting in touch with a fellow student to get the notes for the work that you missed. I do not provide my lecture notes to anyone, since as you will soon see, our class periods are much more discussion-based and focused on the work you complete outside of class. ***NOTE that you may not be able to make up work that you have missed, and I reserve the right to penalize your grade.**

- **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 a 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 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 phone off before lecture 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**

ANGEL will be used much in this course. If you are not familiar or comfortable 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 files that I post, enter text/data, and then place the file 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. Do not email me from an outside email account you might have (such as AOL or hotmail) – if you do, expect my response to your Penn State email account. 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 use professional etiquette when emailing me – don't use all lower-case letters, don't use

abbreviations that you might use if you were going to IM someone, and please type your name at the end of the message.

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 some lecture sessions and field exercises. You will be assigned a specific Palm Pilot that you will pick up from me at the beginning of lecture and return at the end of class. Training will be given on how to use the Palms on the first day. 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 some of our in-class projects and part of your final exam will be on the Palms... you lose your Palm privileges, you will forfeit the right to complete the projects and take the final exam with them!)

- **Late Assignments**

In a nutshell, you will not be allowed to turn in assignments late during this summer course. It is your responsibility to stay on top of deadlines. **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, AOL was down, etc.). I will not make exceptions if you wait until 5 minutes before an assignment is due to hand it in.

Unless I tell you otherwise, all assignments will be turned in via an ANGEL dropbox or ANGEL quiz. **DO NOT** place paper copies of assignments in my mailbox or under my office door. I will not be responsible for assignments not turned in via ANGEL.

- **Final Exam**

Yes, we will have a **REQUIRED** cumulative final for this course – but it won't be the traditional type of final. The final is on the last scheduled day of class (Thursday, June 2nd) starting at 9AM. The first part consists of multiple-choice questions you will have 45 minutes to complete in CLASS 101. Then we will move to CLASS 106 for the second part of the exam. The first part is closed-book, the second part is open-note.

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 am here to help you IF you put in the effort and work yourself!** 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 or 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). Again, I do not provide notes from my lectures if you miss lecture – you will have to get notes from someone else in the class.

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 summer session 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 miscellaneous exercises, a service project, and the final exam, for 411 points total. The breakdown is as follows:

157 points – multiple-choice questions	114 points – essay questions
20 points – CO2 paper	20 points – campus biodiversity paper
20 points – urban heat paper	20 points – sound/temp/CO2 cars paper
30 points – campus profile paper	30 - Final Exam project

The final grades will be assessed at the end of the semester as a % 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, curve any grades, or round up any grades on individual assignments during or on the final average at the end of the semester. Extra credit is not available.***

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 share assignments, 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 day.

Breakdown of topics covered during each class meeting

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

Readings are to be completed BEFORE coming to the NEXT lecture. In addition to your textbook, readings will also be placed in ANGEL – it is your responsibility to check the folders in ANGEL corresponding to each week for the readings and supplemental internet links (if applicable).

Monday, May 16th

Introduction, syllabus, academic integrity and plagiarism, Palm Pilot training, iWaste lecture, CO2 breath test and experiment

ASSIGN: ISSUE 1 (all responses due in ANGEL 8:30AM 05/17)

Is the Precautionary Principle a Sound Basis for International Policy?

Tuesday, May 17th

Discussion of Issue 1, caution on environmental websites, Ecological Footprint exercise, CO2 results, how to write a scientific paper

DUE: ISSUE 1 in ANGEL by 8:30AM

ASSIGN: CO2 paper (due in ANGEL at 11PM on 05/19)

ASSIGN: ISSUE 2 (all responses due in ANGEL 8:30AM 05/18)

Is Sustainable Development Compatible With Human Welfare?

ASSIGN: ISSUE 3 (all responses due in ANGEL 8:30AM 05/18)

Should a Price Be Put on the Goods and Services Provided by the World's Ecosystems?

Wednesday, May 18th

Discussion of Issues 2 & 3, urban heat effect

DUE: ISSUES 2 and 3 in ANGEL by 8:30AM

ASSIGN: urban heat project (due in ANGEL 11PM 05/18)

DUE: urban heat project (11PM in ANGEL)

ASSIGN: ISSUE 4 (all responses due in ANGEL 8:30AM 05/19)

Is Biodiversity Overprotected?

ASSIGN: ISSUE 7 (all responses due in ANGEL 8:30AM 05/19)

Do Environmentalists Overstate Their Case?

Thursday, May 19th

Discussion of Issues 4 & 7, campus biodiversity assessment

DUE: ISSUES 4 and 7 in ANGEL by 8:30AM, CO2 paper in ANGEL by 11PM

ASSIGN: campus biodiversity paper (due in ANGEL 11PM on 05/23)

ASSIGN: ISSUE 5 (all responses due in ANGEL 8:30AM 05/23)
Should Environmental Policy Attempt to Cure Environmental Racism?

ASSIGN: ISSUE 6 (all responses due in ANGEL 8:30AM 05/23)
Can Pollution Rights Trading Effectively Control Environmental Problems?

Monday, May 23rd

Discussion of Issues 5 & 6, sound/temp/CO2 from our cars

DUE: ISSUES 5 and 6 in ANGEL by 8:30AM, campus biodiversity paper in ANGEL by 11PM

ASSIGN: sound/temp/CO2 cars project (due in ANGEL at 11PM on 05/24)

ASSIGN: ISSUE 8 (all responses due in ANGEL 8:30AM 05/24)
Should the Arctic National Wildlife Refuge Be Opened to Oil Drilling?

ASSIGN: ISSUE 9 (all responses due in ANGEL 8:30AM 05/24)
Should Society Act Now to Forestall Global Warming?

Tuesday, May 24th

Discuss Issues 8 & 9, Exxon Valdez, Prestige, natural oil leaks, oil video

DUE: ISSUES 8 and 9 in ANGEL by 8:30AM, cars project in ANGEL at 11PM

ASSIGN: ISSUE 10 (all responses due in ANGEL 8:30AM 05/25)
Will Hydrogen End Our Fossil-Fuel Addiction?

ASSIGN: ISSUE 11 (all responses due in ANGEL 8:30AM 05/25)
Should Existing Power Plants Be Required to Install State-of-the-Art Pollution Controls?

Wednesday, May 25th

Discussion of Issues 10 & 11, campus profiling part I

DUE: ISSUES 10 and 11 in ANGEL by 8:30AM

ASSIGN: campus profile project (due in ANGEL at 11PM on 05/31)

ASSIGN: ISSUE 13 (all responses due in ANGEL 8:30AM 05/26)
Is Limiting Population Growth a Key Factor in Protecting the Global Environment?

ASSIGN: ISSUE 14 (all responses due in ANGEL 8:30AM 05/26)
Is Genetic Engineering an Environmentally Sound Way to Increase Food Production?

Thursday, May 26th

Discussion of Issues 13 & 14, campus profiling part II

DUE: ISSUES 13 and 14 in ANGLE by 8:30AM

ASSIGN: ISSUE 15 (all responses due in ANGEL 8:30AM 05/31)
Are Marine Reserves Needed to Protect Global Fisheries?

ASSIGN: ISSUE 16 (all responses due in ANGEL 8:30AM 05/31)
Should DDT Be Banned Worldwide?

Tuesday, May 31st

Discuss Issues 15 & 16, water quality at Ridley Creek State Park

DUE: ISSUES 15 and 16 in ANGEL by 8:30AM

ASSIGN: ISSUE 12 (all responses due in ANGEL 8:30AM 06/02)
Is It Time to Revive Nuclear Power?

ASSIGN: ISSUE 19 (all responses due in ANGEL 8:30AM 06/02)
Should the United States Continue to Focus Plans for Permanent Nuclear Waste Disposal Exclusively at Yucca Mountain?

Wednesday, June 1st

Discuss Issues 12 & 19, Yucca Mountain status

DUE: ISSUES 12 and 19 in ANGEL by 8:30AM

ASSIGN: ISSUE 17 (all responses due in ANGEL 8:30AM 06/01)
Do Environmental Hormone Mimics Pose a Potentially Serious Health Threat?

ASSIGN: ISSUE 18 (all responses due in ANGEL 8:30AM 06/01)
Is the Superfund Program Successfully Protecting the Environment from Hazardous Wastes?

Thursday, June 2nd **FINAL EXAM -- DUE:** ISSUES 17/18 in ANGEL by 8:30AM

9AM-9:45AM Part I – in CLASS 101, closed notes, multiple-choice questions

9:45-12:30PM Part II – in CLASS 106, open notes/book/internet, essay

QUESTIONS for TAKING SIDES: Clashing Views on Controversial Environmental Issues

*NOTE: These questions are listed in numerical chapter order, NOT in the order they are being assigned or the order they are due. Please pay careful attention to what is assigned in the syllabus!

ISSUE 1: Is the Precautionary Principle a Sound Basis for International Policy?

1. According to the 1992 Rio Declaration on Environment and Development, the precautionary principle requires that we act to prevent serious or irreversible damage:
 - a. Even when there is no scientific evidence that harm can or will happen.
 - b. Only when the scientific evidence of future harm is clear and incontrovertible.
 - c. Even when we lack full scientific certainty.
 - d. Only when the benefits are minor.
2. According to the 1992 Rio Declaration on Environment and Development, precautions taken under the precautionary principle:
 - a. Should be cost-effective.
 - b. Should be cost-free.
 - c. Should be taken without regard to cost.
 - d. Should be taken only if they lack side-effects.
3. According to Marco Martuzzi and Roberto Bertollini, the precautionary principle is a valuable tool for deciding what to do:
 - a. when human health is at risk.
 - b. when politicians fail to agree.
 - c. when the risks to health and the environment are clear.
 - d. where there is large uncertainty.
4. According to Marco Martuzzi and Roberto Bertollini, the European approach to the precautionary principle emphasizes:
 - a. public debate over the appropriateness of an action.
 - b. clarifying how much evidence is needed to take an action.
 - c. risk-benefit analysis.
 - d. the value of weak scientific evidence.
5. According to Marco Martuzzi and Roberto Bertollini, the precautionary principle and health impact assessment share all but which of the following features:
 - a. putting the burden of proof on the proponents of an action.
 - b. taking action in the face of uncertainty.
 - c. transparency of the process.
 - d. analysis of alternatives.
6. According to Henry I. Miller and Gregory Conko, the precautionary principle errs by focusing on the _____ of harm.
 - a. Possibility.
 - b. Plausibility.
 - c. Certainty.

- d. Impossibility.
7. According to Henry I. Miller and Gregory Conko, the danger in the precautionary principle is that it distracts consumers and policy-makers from:
- a. Uncertain threats to the environment.
 - b. Known, significant threats to human health.
 - c. Known, minor threats to human health.
 - d. Serious threats to the environment.
8. According to Henry I. Miller and Gregory Conko, when a decision-maker permits something harmful to happen (as when a harmful product is approved for marketing), this is an example of a _____ error.
- a. Precautionary.
 - b. Cautionary.
 - c. Type II.
 - d. Type I.
9. According to Henry I. Miller and Gregory Conko, when a decision-maker prevents something beneficial from happening (as when a useful product is barred from the market), this is an example of a _____ error.
- a. Precautionary.
 - b. Cautionary.
 - c. Type II.
 - d. Type I.

Essay Questions

1. To what extent must the precautionary principle require that all nations respond to potential environmental problems in the same way?
2. Should we pay more attention to the potential risks or the potential benefits of a proposed action? Defend your answer.

ISSUE 2: Is Sustainable Development Compatible With Human Welfare?

1. "Sustainability" refers to:
 - a. Continuing current levels of resource use.
 - b. Continuing to meet human needs.
 - c. Keeping the debate over environmental protection going.
 - d. Continuing current growth in population and resource use.
2. What set sustainability firmly on the global agenda and made it an essential part of efforts to deal with global environmental issues and promote equitable economic development?
 - a. The Brundtland report.
 - b. The Payne-Davidson Compromise.
 - c. The Montreal Protocol.
 - d. The 1992 Rio Conference on Environment and Development.
3. According to Dinah M. Payne and Cecily A. Raiborn, to discuss "sustainable development" sensibly requires defining:

- a. The needs of the present.
 - b. Economic viability.
 - c. Social justice
 - d. Environmental appropriateness.
 - e. All the above.
4. According to Dinah M. Payne and Cecily A. Raiborn, the chief reason why businesses practice sustainable development is:
- a. To comply with legal regulations.
 - b. Promoting good relations.
 - c. Creating shareholder value.
 - d. Moral commitment to environmental stewardship.
5. According to Dinah M. Payne and Cecily A. Raiborn, businesses can pursue sustainability at four levels. At which of the following levels does a business see the environment as fundamental to the business's, society's, and the earth's continued existence?
- a. Practical.
 - b. Theoretical.
 - c. Philosophical.
 - d. Basic.
6. According to Ronald Bailey, the "greens" are right about:
- a. The need for sustainable development.
 - b. The severity of global poverty.
 - c. The undesirability of flush toilets.
 - d. The need to revise the environmentalist agenda.
7. According to Ronald Bailey, the "greens" believe that in order to achieve sustainable development:
- a. Global business must be reined in.
 - b. Both birth rates and death rates must continue to rise.
 - c. Society must be made richer.
 - d. Electricity must not be introduced into Third World countries.
8. According to Ronald Bailey, the best way to protect the global environment is to:
- a. Strengthen environmental protection laws and treaties.
 - b. Greatly restrict international trade.
 - c. Relieve global poverty.
 - d. Restrict the use of technology in Third World countries.

Essay Questions

1. Dinah M. Payne and Cecily A. Raiborn say that when businesses pursue sustainability at the "currently attainable" level, they pursue a "greater good" that is actually the good of the organization. Explain.
2. Ethics means the study of and guidelines for right behavior, and we can speak of "business ethics," "computer ethics," "political ethics," "bioethics," and so on. Should environmental responsibility and sustainable development be part of ethics? In what areas?

ISSUE 3: **Should a Price Be Put on the Goods and Services Provided by the World's Ecosystems?**

1. According to Janet N. Abramowitz, who believes that a price should be put on the goods and services provided by the world's ecosystems, efforts to conserve and protect ecosystem services are not very successful because
 - a. there is little public concern about these services.
 - b. the cost of protection is too high.
 - c. progress requires sacrificing these assets.
 - d. they have no readily perceived economic value.
2. Marino Gatto and Giulio A. De Leo, who do not believe that a price should be put on the goods and services provided by the world's ecosystems, consider the pricing approach to ecosystem services
 - a. inadequate.
 - b. misleading.
 - c. obsolete.
 - d. all of the above
3. Two examples of nature's "free" services cited by Abramowitz are
 - a. crop pollination and clean water.
 - b. deserts and topsoil.
 - c. sunlight and tidal forces.
 - d. cloud cover and smog.
4. Abramowitz asserts that the problem with human-created simplified ecosystems is that
 - a. we cannot easily tell how the costs of creating them show in the products they provide.
 - b. they do not recover well from short-term disturbances.
 - c. they tend to become more complex over time.
 - d. they are expensive to maintain.
5. Abramowitz argues that the consequences for nature of the loss of ecosystem services are often
 - a. economic and replaceable.
 - b. predictable and political.
 - c. replaceable and expensive.
 - d. unforeseen and unpredictable.
6. Gatto and De Leo assert that the pricing approach to ecosystem services erroneously implies that
 - a. complex environmental decisions can be based on a single scale of values.
 - b. there is a "market" for ecosystem services.
 - c. ecosystem services can be replaced.
 - d. people are unwilling to pay for ecosystem services.
7. Which of the following do Gatto and De Leo identify as a major problem with cost-benefit analysis?
 - a. It encourages policymakers to focus on things that can be measured and quantified.
 - b. It encourages policymakers to ignore large problems.

- c. It ignores values of social equity, natural capital, and human health.
 - d. all of the above
8. According to Gatto and De Leo, the pricing approach to ecosystem services is
- a. dangerously misleading.
 - b. possible and even helpful for assessing part of ecosystem value.
 - c. essential to proper decision making.
 - d. an attractive alternative to multiattribute analysis.

Essay Questions

1. What is meant by the "replacement value" of an ecosystem service?
2. What services does an intact forest provide to humanity? In what sense are those services "free"?

ISSUE 4: Is Biodiversity Overprotected?

1. According to David N. Laband, our majority-rule voting process encourages:
 - a. Overprotection of endangered species.
 - b. Underprotection of endangered species.
 - c. Funding of environmental protection efforts by federal taxes.
 - d. Urban funding of rural protection efforts.
2. According to David Laband, a major problem with environmental protection efforts is:
 - a. Requiring urbanites disproportionately to bear the costs.
 - b. Requiring landowners disproportionately to bear the costs.
 - c. Excessive respect for private property rights.
 - d. The inadequacy of command and control policies.
3. According to David N. Laband, because private landowners bear the costs of producing biodiversity:
 - a. Landowners should determine the appropriate methods.
 - b. Nonlandowners are unconcerned about the costs.
 - c. Regulators consult too closely with landowners.
 - d. Nonlandowners demand too much biodiversity.
4. According to David N. Laband, making responsible choices about environmental protection means:
 - a. Putting the burden of costs on those whose actions most threaten biodiversity.
 - b. Minimizing government regulatory actions.
 - c. Sharing the burden of costs between landowners and nonlandowners.
 - d. Using eminent domain to take public ownership of threatened ecosystems.
5. According to Howard Youth, the percentage of bird species that may face extinction in the next century is about:
 - a. 12 percent.
 - b. 25 percent.
 - c. 50 percent.
 - d. 75 percent.

6. According to Howard Youth, biodiversity can be protected in ways that also generate economic benefits. Examples include:
 - a. Shade-grown coffee.
 - b. Eco-tourism.
 - c. Paying farmers to set aside land for conservation.
 - d. All the above.
7. According to Howard Youth, the greatest threat to bird species is:
 - a. Toxic chemicals.
 - b. Habitat loss.
 - c. Climate change.
 - d. The illegal pet trade.
8. According to Howard Youth, actions that benefit both birds and humans do not include:
 - a. Cleaning up polluted areas.
 - b. Reducing use of harmful pesticides.
 - c. Controlling exotic species.
 - d. Encouraging global warming to prevent harmful freezes.

Essay Questions

1. In what ways do heavy-handed command and control policies work against the aim of protecting biodiversity, according to David N. Laband?
2. "Earth's limited resources cannot provide all things to all people simultaneously." Do you agree or disagree? Defend your answer.

ISSUE 5: Should Environmental Policy Attempt to Cure Environmental Racism?

1. According to Robert D. Bullard, environmental racism is any environmental policy, practice, or directive that:
 - a. Is deliberately intended to disadvantage members of minority groups.
 - b. Negatively affects (whether deliberately or not) individuals, groups, or communities based on race or colour.
 - c. Is prohibited by the Civil Rights Act.
 - d. Members of minority groups or communities object to.
2. According to Robert D. Bullard, the 1991 National People of Color Environmental Leadership Summit effectively broadened the definition of the environment to include:
 - a. Aquatic ecosystems.
 - b. Contaminated political systems.
 - c. Social factors such as where people live, work, and play.
 - d. The courts.
3. According to Robert D. Bullard, the impetus behind the environmental justice movement has come from:
 - a. University environmental scientists.
 - b. Civil rights activists.
 - c. Nationally based environmental and conservation groups.

- d. People of color, civil rights organizers, and grassroots activists.
4. According to Robert D. Bullard, the beneficiaries of the nation's environmental policies should be:
 - a. All communities, rich and poor, white and minority.
 - b. Whites and those with the most education and income.
 - c. Those most affected by environmental problems.
 - d. The poor and members of minority groups.
 5. According to David Friedman, who does not believe that environmental policy should attempt to cure environmental racism:
 - a. The evidence for the existence of environmental racism is suggestive but not persuasive.
 - b. Environmental racism is just an unfortunate result of marketplace forces.
 - c. Minorities actually benefit from environmental racism.
 - d. Health data fail to show minorities being poisoned by toxic sites.
 6. According to David Friedman, environmental justice advocates are:
 - a. Interested in radical politics, not in improving people's lives.
 - b. Justified but economically misguided.
 - c. Organized by well-funded terrorist groups.
 - d. Aware that they are perpetrating a hoax.
 7. According to David Friedman, the environmental justice movement got nowhere until:
 - a. Toxic wastes released at Love Canal sickened and killed thousands of children.
 - b. The Civil Rights Act was amended to cover environmental racism.
 - c. The EPA convened the advocate-laden National Environmental Justice Council and gave millions of dollars to activist groups.
 - d. The Bush Administration sought to deflect attention from the 2002 accounting scandals.
 8. According to David Friedman, businesses concerned that they could be charged with environmental racism may be expected to:
 - a. Clean up their environmental act.
 - b. "Redline" minority communities and shift operations to less-developed white communities.
 - c. Raise pay in minority communities, so at least poverty will not be an issue.
 - d. Finance medical clinics in affected communities.

Essay Questions

1. What is environmental racism? How does it differ from environmental injustice?
2. Write an imagined response of a leader of a local community-action group from a community affected by a polluting dump to Friedman's assertion that the group is trying to redress an "outrage that doesn't exist."

ISSUE 6: Can Pollution Rights Trading Effectively Control Environmental Problems?

1. According to Charles W. Schmidt, the traditional regulatory approach to controlling pollution was:
 - a. Voluntary compliance.
 - b. Cap and trade.
 - c. Cap and stop.
 - d. Command and control.
2. According to Charles W. Schmidt, economic incentives work by:
 - a. Attaching economic value to the act of reducing pollution
 - b. Motivating companies to reduce pollution quickly.
 - c. Motivating companies to exceed environmental standards whenever possible.
 - d. All the above.
3. According to Charles Schmidt, the success of emissions trading is demonstrated by:
 - a. The Acid Rain Program.
 - b. The Climate Stabilization Program.
 - c. The National Clean Rivers Campaign.
 - d. The Ozone Reduction Program.
4. According to Charles W. Schmidt, the Environmental Protection Agency estimates the potential savings from widespread use of economic incentives at about:
 - a. \$200 million.
 - b. \$100 million.
 - c. \$50 million.
 - d. \$23 million.
5. According to Brian Tokar, who believes that pollution rights trading cannot effectively relieve environmental problems, an international emissions trading program will:
 - a. Benefit less-developed nations only.
 - b. Raise energy costs.
 - c. Appeal only to small-volume polluters.
 - d. Widen economic inequalities among nations.
6. According to Brian Tokar, tradeable pollution credits (whose use he opposes) may reduce:
 - a. Corporate environmental abuse.
 - b. Pollution.
 - c. The cost of complying with regulations.
 - d. The inflationary impact of regulations.
7. According to Brian Tokar, an "ecological economy" must replace "the more extreme forms of competition that thoroughly dominate today's economy" with:
 - a. Cooperative, symbiotic interactions.
 - b. A purer form of capitalism.
 - c. Market-based methods for controlling pollution.
 - d. Reliance on industrial self-regulation.
8. According to Brian Tokar, tradable rights to emit pollutants are contained in the 1990 amendments to:
 - a. The Clean Water Act.
 - b. The Clean Air Act.
 - c. The Endangered Species Act.
 - d. The Climate Stabilization Act.

Essay Questions

1. On what basis does Brian Tokar object to treating such environmental resources as clean air and clean water as commodities?
2. If the regulatory bodies in charge of assigning permitted pollution limits or caps reduce those caps over time, what will happen to overall pollution levels? What will happen if the caps stay the same over time?

ISSUE 7: Do Environmentalists Overstate Their Case?

1. According to Ronald Bailey, modern environmentalism was born of the:
 - a. Preservationist movement of the early 1900s.
 - b. Conservationist movement of the 1930s.
 - c. Radical movements of the 1960s.
 - d. Carsonite movement of the late 1950s.
2. According to Ronald Bailey, discussing Bjorn Lomborg's *The Skeptical Environmentalist: Measuring the Real State of the World*, predictions of environmental doom:
 - a. Are correct and we should be concerned about the future of humanity.
 - b. Are not backed up by the available evidence.
 - c. Would vanish if environmentalists took more Prozac.
 - d. Are backed up by ample scientific data.
3. According to Ronald Bailey, the following environmental trends are true:
 - a. Human life expectancy has increased.
 - b. Air pollution has decreased.
 - c. Food supply in developing countries has increased.
 - d. All the above.
4. According to Ronald Bailey, the solution to existing problems of malnutrition, clean water supply, and poor sanitation is:
 - a. Ideological environmentalism.
 - b. The spread of democracy.
 - c. The spread of socialism.
 - d. Continued economic growth.
5. According to David Pimentel, Lomborg's views about the environment are based on:
 - a. Selective use of scientific data.
 - b. Solid scientific data.
 - c. A poor understanding of economics.
 - d. A poor understanding of physics.
6. According to David Pimentel, the world's per capita food supply:
 - a. Is greater than ever in history.
 - b. Has been rising slowly for the last twenty years.
 - c. Has been declining since 1984.
 - d. Will be stable for the foreseeable future.
7. According to David Pimentel, the loss of soil to erosion is:

- a. Not a problem, at least in the U.S.
 - b. Less than the rate of soil formation.
 - c. More damaging worldwide than in the U.S.
 - d. Less damaging worldwide than in the U.S.
8. According to David Pimentel, contrary to Lomborg's view, infectious diseases:
- a. Are decreasing worldwide.
 - b. Are increasing worldwide.
 - c. Are increasing in developed nations but not in developing nations.
 - d. Are increasing in developing nations but not in developed nations.

Essay Questions

1. Which parts of the "Litany" of environmentalist doom seem least worrisome to you? Which seem most worrisome?
2. Ronald Bailey seems to think that if environmental resources were owned, they would be less likely to be abused. Why?

ISSUE 8: Should the Arctic National Wildlife Refuge Be Opened to Oil Drilling?

1. According to Dwight R. Lee, if the oil beneath the Arctic National Wildlife Refuge is exploited, accidents that damage the environment:
 - a. Might happen.
 - b. Are totally unacceptable.
 - c. Probably will not happen.
 - d. Will not cause significant damage.
2. According to Dwight R. Lee, the Audubon Society approves of drilling for oil in protected areas:
 - a. Everywhere.
 - b. In the ANWR.
 - c. That it owns and gains economic benefit from.
 - d. That are surrounded by industrial development.
3. According to Dwight R. Lee, the money offered for drilling rights in the Audubon Society's Rainey Wildlife Sanctuary can be seen as:
 - a. Subversion of Audubon's ideals.
 - b. A way to protect wildlife from excessive harvesting.
 - c. Temptation to hypocrisy.
 - d. The most effective way for millions of people to say what they value.
4. Dwight R. Lee suggests making environmental organizations accountable for the costs of preventing drilling. What costs does he have in mind?
 - a. Environmental cleanup costs.
 - b. Lobbying costs.
 - c. The costs of not protecting other areas using drilling revenue.
 - d. The cost of lawsuits filed by people killed driving small cars.

5. According to Katharine Balpataky, _____ have shown that the resources required to extract Arctic National Wildlife Refuge oil are too great to make drilling worthwhile.
- Many cost-benefit studies
 - No cost-benefit studies
 - Careful ecological analyses
 - Bush Administration policy reports
6. According to Katharine Balpataky, existing oil development work on Alaska's North Slope has:
- Heavily contaminated the Arctic Sea with oil spills.
 - Had no significant environmental effects.
 - Affected migration of whales, reproduction of birds, and distribution of caribou.
 - Destroyed local hospital nurseries.
7. According to Katharine Balpataky, the Gwich'in elders believe that the question of whether to drill for oil in the Arctic National Wildlife Refuge is a question of:
- Satisfying the U.S. appetite for oil.
 - Human rights.
 - Environmentalism.
 - Making wars against Persian Gulf oil suppliers unnecessary.
8. According to Katharine Balpataky, the Bush Administration is promoting the view that the Arctic National Wildlife Refuge is:
- A beautiful vacation spot that more Americans should visit.
 - A fertile and potentially productive agricultural zone.
 - A suitable location for military bases.
 - A wasteland.

Essay Questions

- For what benefits is it worth sacrificing intact environments such as the Arctic National Wildlife Refuge?
- Do you think Dwight R. Lee's thought experiment about giving environmental organizations a share of the revenues from ANWR drilling has merit? Can you think of any disadvantages to this scheme?

ISSUE 9: Should Society Act Now to Forestall Global Warming?

1. According to George Marshall and Mark Lynas, every scientific institution and national government in the world:
- Agrees that global warming is a major threat to the planet's future.
 - Rejects the IPCC's conclusion that global warming is a major threat to the planet's future.
 - Insists that more research is necessary before we try to do anything to prevent further global warming.
 - Blames the Former Soviet Union for global warming.

2. According to George Marshall and Mark Lynas, the financial impact of global warming is expected to exceed _____ per year by 2050.
 - a. \$50 billion.
 - b. \$100 billion.
 - c. \$300 billion.
 - d. \$1000 billion.
3. According to George Marshall and Mark Lynas, humans find it difficult to deal with future threats that are:
 - a. Less certain.
 - b. Causally complex.
 - c. Not immediate threats.
 - d. Self-inflicted.
 - e. All the above.
4. According to George Marshall and Mark Lynas, people may delay taking action about global warming until the effects are severe. Even then, our strongest impulse may be to:
 - a. Finally stop using fossil fuels.
 - b. Adapt by building dams, dykes, and storm shelters.
 - c. Found new religions.
 - d. Reduce population.
5. According to John R. Christy, the past thousand years of global temperature history have been dominated by:
 - a. A cooling trend.
 - b. A warming trend.
 - c. Erratic ups and downs with no clear trend.
 - d. We cannot say, for we have too few data to draw conclusions.
6. According to Fred Singer, warming the ocean (as by global warming) will cause changes in cloud cover that:
 - a. Enhance global warming.
 - b. Reduce global warming.
 - c. Turn global warming into global cooling.
 - d. Warm the north but cool the tropics.
7. According to Fred Singer, as far as we can tell, global climate is:
 - a. warming more rapidly than greenhouse theory predicts.
 - b. behaving in a way entirely consistent with greenhouse theory.
 - c. not warming as it should be if the greenhouse theory is correct.
 - d. long overdue for beneficial change.
8. According to Fred Singer, when theory predicts a problem but the data do not show the problem happening, government programs should be designed to:
 - a. prevent the problem from happening.
 - b. focus on other problems, at least until the data change.
 - c. improve the quality of the data.
 - d. determine whether the "problem" is really a problem or a benefit.
9. According to Fred Singer, the best indicator of how serious environmental problems are is:
 - a. changes in air quality over time.
 - b. changes in global climate over time.

- c. changes in food supply over time.
- d. changes in human well-being.

Essay Questions

1. Discuss how the nature of science permits critics to say that the evidence of global warming is not incontrovertible.
2. In what areas of human life does global warming seem likely to cause the most suffering? In what areas does it seem likely to improve human welfare?

ISSUE 10: Will Hydrogen End Our Fossil-Fuel Addiction?

1. According to Jeremy Rifkin, switching to a decentralized hydrogen power grid would:
 - a. Provide protection against terrorist attacks.
 - b. Reduce carbon dioxide emissions and mitigate the effects of global warming.
 - c. Alter society's market, political, and social institutions.
 - d. All the above.
2. According to Jeremy Rifkin, nearly half the hydrogen produced today comes from:
 - a. Steam-reforming of natural gas.
 - b. Nuclear-powered hydrolysis.
 - c. Hydrolysis powered by renewable sources of electricity such as wind and solar.
 - d. Underground deposits, just like natural gas.
3. According to Jeremy Rifkin, the "Hydrogen Energy Web" depends on:
 - a. Major corporations deciding to bring hydrogen fuel to market.
 - b. Wide distribution of fuel cells and renewable electricity generators.
 - c. A global environmentalist revolution.
 - d. The removal of government regulations from the energy industry.
4. According to Jeremy Rifkin, the most doubtful aspect of his vision of the hydrogen-powered future is:
 - a. The availability of hydrogen.
 - b. The technology for producing and using hydrogen fuel.
 - c. The political will to make it happen.
 - d. The affordability of the technology.
5. According to Henry Payne and Diane Katz, which of the following factors explain why oil will continue to fuel America's vehicles for the foreseeable future?
 - a. Economics.
 - b. Geography.
 - c. Consumer choice.
 - d. All the above.
6. According to Henry Payne and Diane Katz, the reasons why the Bush Administration supports developing hydrogen-powered cars do NOT include:
 - a. Preparing for the time when there will be no more oil.
 - b. Shielding automakers from demands for more fuel-efficient vehicles.
 - c. Gaining support for more Arctic oil drilling.
 - d. Making America less dependent on oil-producing nations.

7. According to Henry Payne and Diane Katz, obtaining hydrogen from methane would:
 - a. Make America independent of foreign sources.
 - b. Leave America dependent on foreign sources.
 - c. Be pollution-free.
 - d. Require the use of nuclear power.
8. According to Henry Payne and Diane Katz, the market mechanisms that can mitigate potential oil shortages include:
 - a. Stockpiling.
 - b. Diversifying the supplier base.
 - c. Relaxing regulatory restrictions.
 - d. All the above.

Essay Questions

1. According to Jeremy Rifkin, a hydrogen-based economy would bear certain resemblances to the World Wide Web (Internet). Describe those resemblances.
2. Explain how, according to Jeremy Rifkin, hydrogen energy and renewable energy will help each other out in the developing world.

ISSUE 11: Should Existing Power Plants Be Required to Install State-of-the-Art Pollution Controls?

1. According to Eliot Spitzer, the New Source Review provisions of the Clean Air Act:
 - a. Constitute a powerful tool to rein in harmful pollution.
 - b. Impose unreasonable demands on electric utilities that wish to improve their facilities.
 - c. Offer polluters a large number of loopholes.
 - d. Offer polluters no loopholes at all.
2. According to Eliot Spitzer, the New Source Review provisions of the Clean Air Act were designed to:
 - a. Prevent construction of new power plants.
 - b. Keep pollutant emissions from new sources to minimum levels.
 - c. Permit new sources to emit large amounts of pollutants only with federal approval.
 - d. Immunize older existing sources of pollutants from regulation.
3. According to Eliot Spitzer, the Environmental Protection Agency has exempted from New Source Review routine maintenance, repair, and replacement activities that seem reasonable on the basis of:
 - a. Cost.
 - b. Purpose and frequency.
 - c. Nature and extent.
 - d. All the above.
4. According to Eliot Spitzer, the most alarming aspect of the New Source Review revisions is:
 - a. Industry is no longer required to install state-of-the-art pollution controls.

- b. The EPA will no longer specify required air quality standards.
 - c. The Routine Repair and Maintenance exception is greatly expanded.
 - d. Political contributions now provide immunity from enforcement.
5. According to Jeffrey Holmstead, all interested parties have long agreed that the New Source Review program:
- a. Should be applied to automobiles.
 - b. Is the primary regulatory tool for dealing with air pollution.
 - c. Should be improved.
 - d. Needs no improvement.
6. According to Jeffrey Holmstead, over the last decade the Environmental Protection Agency has made changes to the New Source Review program in order to:
- a. Provide industry with more flexibility and certainty.
 - b. Strengthen the enforcement of air quality standards.
 - c. Weaken the enforcement of air quality standards.
 - d. Enhance industry profits.
7. According to Jeffrey Holmstead, the new changes to the New Source Review program will:
- a. Remove barriers to environmentally beneficial projects.
 - b. Give industries incentives to improve environmental performance when they make change to their facilities.
 - c. Protect air quality.
 - d. All the above.
8. According to Jeffrey Holmstead, the Clear Skies Initiative will not reduce power plant emissions of:
- a. Mercury.
 - b. Carbon dioxide.
 - c. Sulfur dioxide.
 - d. Nitrogen oxides.

Essay Questions

1. According to Eliot Spitzer, the Environmental Protection Agency found soon after New Source Review began that it was difficult to administer. Explain the difficulty and the way(s) the EPA modified NSR to solve it.
2. Eliot Spitzer complains that the New Source Review revisions would allow polluters to increase the amount of pollutants they emit. Explain how an effort to control pollution could let this happen. (This refers to the baseline emissions definition--highest level in any two-year period in the previous ten years)

ISSUE 12: Is It Time to Revive Nuclear Power?

1. According to "The Future of Nuclear Power," in 2002 nuclear power supplied _____ of the United States' electricity supply:
 - a. 17%
 - b. 20%

- c. 30%
 - d. 50%
2. According to "The Future of Nuclear Power," the worrisome problems of nuclear power include:
 - a. terrorist attacks
 - b. misuse of facilities and materials
 - c. waste handling
 - d. higher overall lifetime costs
 - e. all the above
 3. According to "The Future of Nuclear Power," expanding the number of 1000 MW nuclear power plants to 1000-1500 would avoid annually:
 - a. perhaps one quarter of the expected increase by 2050 in carbon emissions
 - b. all additional carbon emissions
 - c. All carbon emissions now due to the use of fossil fuels
 - d. no carbon emissions; the truth is that it would actually increase carbon emissions
 4. According to "The Future of Nuclear Power," an expanded thousand-reaction nuclear power program would generate so much nuclear waste that:
 - a. the storage site at Yucca Mountain will be sufficient for at least the next century
 - b. a new Yucca Mountain-equivalent will be needed every six months
 - c. a new Yucca Mountain-equivalent will be needed every three to four years
 - d. a new Yucca Mountain-equivalent will be needed every ten years
 5. According to Karl Grossman, the Bush Administration's National Energy Policy Development Group:
 - a. supports the expansion of nuclear energy in the United States
 - b. supports the expansion of nuclear energy in the developing world
 - c. opposes the expansion of nuclear energy in the United States
 - d. is strongly in favor of renewable energy sources
 6. According to Karl Grossman, the United States government favors expanding nuclear power because:
 - a. it poses fewer environmental problems than fossil fuels
 - b. Texas has enormous uranium reserves
 - c. nuclear industry lobbyists shower Congress with political contributions
 - d. it hopes that nuclear accidents will reduce the population
 7. According to Karl Grossman, the biggest problem with using Yucca Mountain for nuclear waste disposal is that:
 - a. it has a history of volcanic action
 - b. it is likely to flood
 - c. it is likely to leak
 - d. all the above
 8. According to Karl Grossman, the probability of a serious nuclear accident is:
 - a. very high
 - b. very low
 - c. about the same as that for a fossil fuel power plant
 - d. impossible to determine

Essay Questions

1. What are the four options for reducing carbon dioxide emissions from electricity generation?
2. Terrorists could take advantage of an expanded nuclear power program in many ways. Discuss why the transportation system for nuclear fuel and waste is inherently more vulnerable than a nuclear power plant.

ISSUE 13: Is Limiting Population Growth a Key Factor in Protecting the Global Environment?

1. According to Lester R. Brown, humans use more resources than the Earth can give on an ongoing basis. These resources do NOT include:
 - a. trees
 - b. water
 - c. topsoil
 - d. fish
 - e. none of the above
2. According to Lester R. Brown, humanity's collective demands for resources first surpassed the Earth's regenerative capacity around _____:
 - a. 1950
 - b. 1965
 - c. 1980
 - d. 1995
3. According to Lester R. Brown, humanity's demands on the Earth have multiplied over the last half century as both human numbers and _____ have increased:
 - a. poverty
 - b. income
 - c. women's rights
 - d. the popularity of capitalism
4. According to Lester R. Brown, to prevent catastrophe we must accomplish a number of things, central among which is:
 - a. achieve social justice
 - b. stabilize population
 - c. shift to renewable energy resources
 - d. eradicate disease
5. According to Stephen Moore, the world's birth rates are today:
 - a. Higher than ever before in history.
 - b. Lower than at any time in recorded history.
 - c. Rising steadily toward catastrophic levels.
 - d. Declining so rapidly that the human species is in danger of extinction.
6. According to Stephen Moore, if the human population reaches 12 billion in the 21st century, those 12 billion will undoubtedly be:
 - a. Disastrously short of food and clean water.
 - b. Crowded into polluted and disease-ridden cities.

- c. Tyrannized by population-control thugs.
 - d. Better fed than today's 6 billion.
7. According to Stephen Moore, the greatest threat to the Earth is:
 - a. Too much statism.
 - b. Too many people.
 - c. Too much war.
 - d. The lack of predators on humans.
 8. According to Stephen Moore, the best way to stimulate a decrease in population growth is:
 - a. Privatization and free markets.
 - b. government-funded family planning programs.
 - c. one family-one child policies.
 - d. the education of young women.
 9. According to Stephen Moore, Malthusian activists see people primarily as:
 - a. Having intrinsic value.
 - b. Solvers of problems.
 - c. Producers of resources.
 - d. Consumers of resources.

Essay Questions

1. Discuss why food is or will be a national security issue.
2. If birth rates are lower than at any time in recorded history, as Stephen Moore claims, why are we concerned about population growth?

ISSUE 14: Is Genetic Engineering an Environmentally Sound Way to Increase Food Production?

1. According to the "Transgenic Plants and World Agriculture" report, addressing hunger and poverty around the globe while protecting the environment requires:
 - a. New knowledge, appropriate new technologies, and broad dissemination of both.
 - b. Genetic engineering of crop plants.
 - c. Turning national governments over to the UN in order to assure equitable distribution of available food.
 - d. An immediate reduction in global population.
2. According to the "Transgenic Plants and World Agriculture" report, genetic engineering should be used to:
 - a. Increase production of main food staples.
 - b. Improve efficiency of food production.
 - c. Reduce the environmental impact of agriculture.
 - d. Provide access to food for small-scale farmers.
 - e. All the above.
3. According to the "Transgenic Plants and World Agriculture" report, transgenic crop research and development should NOT be focused on:
 - a. Increasing the environmental impacts of intensive agriculture.

- b. Improving nutrition available to the consumer.
 - c. Increasing the availability of pharmaceuticals and vaccines.
 - d. Finding ways to ensure that non-food transgenic crops do not mix genes with food crops.
4. According to the "Transgenic Plants and World Agriculture" report, toxicity testing for foods derived from genetically engineered crops is:
- a. Much more difficult than for foods derived from plants produced by conventional methods.
 - b. Almost impossible, since foreign genes may have unpredictable effects.
 - c. Absolutely essential, since genetic engineering is by its very nature unnatural and hazardous.
 - d. More straightforward than for foods from conventionally produced plants, since only one or at most a few well-defined genes are introduced.
5. According to Brian Halweil, who does not believe that biotechnology is an environmentally sound way to increase food production, the global, commercial planting of transgenic crops has taken place almost exclusively in the United States and the nations of:
- a. Japan and Brazil.
 - b. Canada and Argentina.
 - c. Japan and Canada.
 - d. Argentina and Brazil.
6. According to Brian Halweil, one of biotechnology's real potentials for agriculture is:
- a. The production of pest-resistant crops.
 - b. Increased efficiency of food production.
 - c. As a means of studying crop pathogens.
 - d. In the promotion of biodiversity.
7. According to Brian Halweil, the global transgenic harvest is currently dominated by:
- a. Herbicide-resistant crops.
 - b. Insect-resistant crops.
 - c. Nutritionally enhanced crops.
 - d. Nutraceuticals.
8. According to Brian Halweil, because transgenic crops are patented, they raise serious obstacles to:
- a. Small-scale farmers.
 - b. Serious commercialization.
 - c. Traditional seed-savers.
 - d. International law regarding intellectual property.

Essay Questions

1. What kinds of potential adverse human health effects should public health regulatory systems watch for in connection with GM crops?
2. In what ways is modern agriculture intrinsically destructive of the environment?

ISSUE 15: Are Marine Reserves Needed to Protect Global Fisheries?

1. According to Robert R. Warner, we obtain _____ metric tons of food from the sea each year.
 - a. 25 million
 - b. 80 million
 - c. 150 million
 - d. 8 billion
2. According to Robert R. Warner, a marine reserve is:
 - a. a scenic portion of the ocean maintained for the benefit of tourists
 - b. a portion of the ocean managed for multiple uses
 - c. a portion of the ocean completely protected from all extractive activities
 - d. a portion of the ocean where only U. S. Marines are allowed to fish
3. According to Robert R. Warner, the ocean species that show the strongest positive response to protection by marine reserves are:
 - a. those whose populations have been most affected by exploitation
 - b. those whose populations have been least affected by exploitation
 - c. highly mobile species such as fish
 - d. less mobile species such as shellfish
4. According to Robert R. Warner, most single-species fisheries models of reserves suggest that the greatest impact on yields occurs when what proportion of an area is set aside as a reserve?
 - a. 10 percent
 - b. 20 percent
 - c. 50 percent
 - d. 75 percent
 - e. 20-50 percent
5. According to Sean Paige, the best way to describe a fisher's life is:
 - a. difficult and dangerous
 - b. self-reliant
 - c. angry
 - d. all the above
6. According to Sean Paige, the Tortugas Ecological Reserve was located where it is because:
 - a. relatively few fishers work the area
 - b. so many fishers worked the area in the past that its fish populations badly need protection
 - c. there have never been very many fish there, so there were few objections
 - d. it is not far from the NOAA's regional office
7. According to Sean Paige, the National Fisheries Institute thinks the science used to justify marine reserves is:
 - a. well done and convincing
 - b. mostly missing
 - c. unclear on how reserves will affect the overall health of the fisherythe benefits
 - d. not trustworthy, because it is sponsored by the fishing industry
8. According to Sean Paige, it is only common sense that:
 - a. a marine reserve will benefit the fishery

- b. a fished area will have more fish
- c. fishers are more important to society than fish
- d. an unfished area will have more fish

Essay Questions

1. Discuss why marine reserves benefit fisheries outside the boundaries of the reserves.
2. When it is not possible to set aside a large marine reserve, how may one achieve much the same result?

ISSUE 16: Should DDT Be Banned Worldwide?

1. According to Anne Platt McGinn, the malaria death toll rivals that of AIDS but:
 - a. Much more money is dedicated to this disease.
 - b. The disease receives much less attention from politicians and researchers.
 - c. It is not preventable.
 - d. It is constantly in the news.
2. According to Anne Platt McGinn, the preferred approach to malaria control is:
 - a. Killing the mosquitoes that carry the parasite.
 - b. Killing the parasite once it infects humans.
 - c. Keeping the parasite from infecting mosquitoes.
 - d. Keeping mosquitoes from biting people.
3. According to Anne Platt McGinn, the malaria parasite belongs to the genus:
 - a. Homo.
 - b. Anopheles.
 - c. Culex.
 - d. Plasmodium.
4. According to Anne Platt McGinn, the *Anopheles gambiae* mosquito specializes in human blood and a full-bore campaign to suppress it would probably accomplish little because:
 - a. DDT resistance is widespread.
 - b. The mosquito's efficiency at transmitting malaria is high.
 - c. Even a small population of mosquitoes could keep the disease in circulation.
 - d. All the above.
5. According to Anne Platt McGinn, the most promising African malaria-control programs rely on:
 - a. DDT.
 - b. Bednets impregnated with nonpersistent insecticides.
 - c. Draining all bodies of water in which mosquitoes might breed.
 - d. Moving people out of zones where malaria is most common.
6. According to Anne Platt McGinn, the use of insecticide-bednets is not common in most of Africa because:
 - a. DDT is so effective.
 - b. Malaria is not common enough to be a major concern.
 - c. Taxes and tariffs make them too expensive.

- d. Window screens and air conditioners make them unnecessary.
7. According to Alexander Gourevitch, the cheapest and most effective way to combat malaria is:
 - a. Bednets.
 - b. DDT.
 - c. Draining swamps.
 - d. Window screens.
 8. According to Alexander Gourevitch, the latest scientific evidence:
 - a. confirmsthat DDT causes cancer in humans.
 - b. confirmsthat DDT is toxic to humans.
 - c. confirms that DDT, when sprayed on walls, contaminates groundwater.
 - d. None of the above.
 9. According to Alexander Gourevitch, the malaria-fighting measures that aid agencies are willing to fund are, compared to DDT:
 - a. less effective.
 - b. less expensive.
 - c. easier to administer.
 - d. the only ones permitted by the aid agencies' own rules.
 10. According to Alexander Gourevitch, South Africa switched from using pyrethroid for fighting mosquitos to using DDT because:
 - a. pyrethroid was hard for South Africa to afford.
 - b. pyrethroid just didn't work.
 - c. mosquitos became resistant to pyrethroid.
 - d. pyrethroid would not stick to bednets.

Essay Questions

1. Discuss how the 2001 Stockholm Convention on Persistent Organic Pollutants will affect the use of DDT against malaria.
2. What will it take, according to Anne Platt McGinn, to increase the use of alternatives to DDT for fighting malaria?

ISSUE 17: Do Environmental Hormone Mimics Pose a Potentially Serious Health Threat?

1. According to Michele L. Trankina, a growing body of evidence indicates that hormone or endocrine-disrupting chemicals can cause developmental and reproductive abnormalities in humans and animals. In humans, concern centers on:
 - a. Premature puberty
 - b. Declining sperm counts
 - c. Increased incidence of breast and testicular cancers.
 - d. All the above.
2. According to Michele L. Trankina, estrogenic chemicals are NOT released by:
 - a. baby bottles

- b. plastic toys
 - c. spermicides
 - d. cosmetics
 - e. none of the above
3. According to Michele L. Trankina, some estrogenic chemicals are found naturally in plants such as soybeans. We can say with confidence that:
- a. We do not need to worry about these chemicals.
 - b. These chemicals are just as dangerous as synthetic estrogenic chemicals.
 - c. Some of these chemicals have beneficial effects.
 - d. Some of these chemicals cause paralysis.
4. According to Michele L. Trankina, plastics makers say they cannot replicate the studies that indict their products. One researcher (vom Saal) responds that:
- a. What the plastics makers say is governed by public relations, not science.
 - b. The plastics makers' researchers did not do the experiments correctly.
 - c. He must redo his own experiments to be sure he did not make mistakes.
 - d. Only government and university scientists can be trusted to be objective.
5. According to Michael Gough, environmental health policy has been based from the beginning on:
- a. ideology
 - b. science
 - c. the bottom line
 - d. religion
6. According to Michael Gough, the evidence linking environmental chemicals to cancer:
- a. is very strong
 - b. only applies to animals
 - c. does not exist
 - d. is fraudulent, since it is motivated by anti-industry ideology
7. According to Michael Gough, Congress responds most promptly to reports of risks to:
- a. human females
 - b. human males
 - c. humans
 - d. wildlife
8. According to Michael Gough, restrictions on pesticides because of fear of their health effects will:
- a. benefit human health
 - b. lower food costs
 - c. improve the diets of the poor
 - d. raise costs of both pesticides and food

Essay Questions

1. Why should evidence that estrogenic chemicals in the environment harm wildlife cause us to be concerned about human health?
2. One popular talk show host has suggested that if environmental estrogens are actually reducing human sperm counts, it is not a problem, because this might help to reduce population growth. Comment on this suggestion.

ISSUE 18: Is the Superfund Program Successfully Protecting the Environment from Hazardous Wastes?

1. According to Robert H. Harris, Jay Vandeven, and Mike Tilchin, the Superfund program has NOT made progress in recent years in:
 - a. scientifically valid risk assessment
 - b. treatment technologies
 - c. flexible risk assessment
 - d. stability of funding
2. According to Robert H. Harris, Jay Vandeven, and Mike Tilchin, "potentially responsible parties" have challenged past risk assessment methods as scientifically flawed, resulting in:
 - a. failure to clean up seriously contaminated sites
 - b. use of unnecessary and too costly remedies
 - c. court decisions that halt Superfund cleanups
 - d. an organizational focus on only mildly contaminated sites
3. According to Robert H. Harris, Jay Vandeven, and Mike Tilchin, cleanup efforts in Superfund's early years were dominated by:
 - a. denial
 - b. paving over contaminated sites
 - c. containment and excavation-and-disposal
 - d. large fines
4. According to Robert H. Harris, Jay Vandeven, and Mike Tilchin, unexpected burdens on the Superfund programs have included:
 - a. hard-rock mining sites
 - b. contaminated waterways and ports
 - c. dealing with emergencies
 - d. all the above
5. According to Margot Roosevelt, the Tar Creek mining site is marked by dust loaded with such toxic materials as lead. Lead's effects on children include:
 - a. respiratory problems
 - b. learning disabilities
 - c. cancer
 - d. all the above
6. According to Margot Roosevelt, the GAO reports that Superfund's budget declined _____ in inflation-adjusted dollars in the last decade:
 - a. 15%
 - b. 25%
 - c. 35%
 - d. 50%
7. According to Margot Roosevelt, every Superfund site is:
 - a. tragic
 - b. clean at last!

- c. funded for cleanup within the next decade
 - d. abandoned
8. According to Margot Roosevelt, the EPA says about Tar Creek:
- a. it will be all cleaned up soon
 - b. we don't know if it can ever be repaired
 - c. it cannot be repaired; residents will just have to grin and bear it
 - d. Mother Nature will fix it if we wait long enough

Essay Questions

1. Critics have objected to private companies acting as profit-making mediators in waste cleanup efforts. Write an essay defending or contesting this argument.
2. With regard to waste site cleanups, how should decisions be made on the question, How clean is clean enough?

ISSUE 19: Should the United States Continue to Focus Plans for Permanent Nuclear Waste Disposal Exclusively at Yucca Mountain?

1. According to U.S. Secretary of Energy Spencer Abraham, nuclear wastes are currently stored in:
 - a. three locations in the state of Washington
 - b. 432 locations scattered across the nation
 - c. 131 aging surface sites in 39 states
 - d. the Waste Isolation Pilot Plant in New Mexico
2. According to U.S. Secretary of Energy Spencer Abraham, even after designating Yucca Mountain as the nation's nuclear waste repository, the Department of Energy must:
 - a. submit an application to the Nuclear Regulatory Commission
 - b. make its case through a formal review process with public hearings
 - c. obtain an operating license
 - d. all the above
3. According to U.S. Secretary of Energy Spencer Abraham, burying nuclear wastes in geological formations was first suggested in:
 - a. 1987
 - b. 1972
 - c. 1965
 - d. 1957
4. According to U.S. Secretary of Energy Spencer Abraham, alternative locations suggested for storing nuclear waste have NOT included:
 - a. the moon
 - b. remote islands
 - c. the deep seabed
 - d. polar ice sheets

5. According to Gar Smith, the most important aspect of the suitability of the Yucca Mountain nuclear waste disposal site is:
 - a. its long-term geological stability
 - b. its affordability in financial and political terms
 - c. the ability to transport waste to the site safely
 - d. its height above sea level, if the seas rise due to global warming
6. According to Gar Smith, the candidate long-term nuclear waste storage sites were reduced to one (Yucca Mountain) because:
 - a. alternative sites in Texas and Washington were not technically suitable
 - b. Texas and Washington were protected by key decision-makers who came from those states
 - c. Only Nevada was willing to host a storage site
 - d. Yucca Mountain was not close to any aquifers
7. According to Gar Smith, the government estimates that over 30 years of shipping nuclear wastes to Yucca Mountain there will be as many as _____ accidents.
 - a. 90,000
 - b. 5,000
 - c. 900
 - d. 100
8. According to Gar Smith, computer simulations of the DOE's Transportation Security Division's ability to deal with terrorist attacks on nuclear waste shipments support the conclusion that:
 - a. terrorists will be instantly destroyed if they try any such thing
 - b. the only safe mode of waste transportation is by air
 - c. the only safe mode of nuclear waste disposal is deep burial
 - d. the terrorists will defeat the defenders

Essay Questions

1. Why, according to U.S. Secretary of Energy Spencer Abraham, is it important for the U.S. to continue to use nuclear power and generate nuclear wastes?
2. Discuss the ethical and political issues associated with the problem of finding a permanent nuclear waste disposal site.

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

In this course, you will be writing scientific reports. Use this as a general guide to prepare your write-ups. Note that a general grading outline used to grade these projects is provided at the end of this handout.

Each project is based on your use of the scientific method. I will be grading the **QUALITY** of your hypothesis. Make sure you put some time and thought into developing and explaining the 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, following the APA style. 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 needs to follow the APA format. See the page towards the end of this handout for an example title 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? 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!). How did you record the data? 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 APA style.

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.

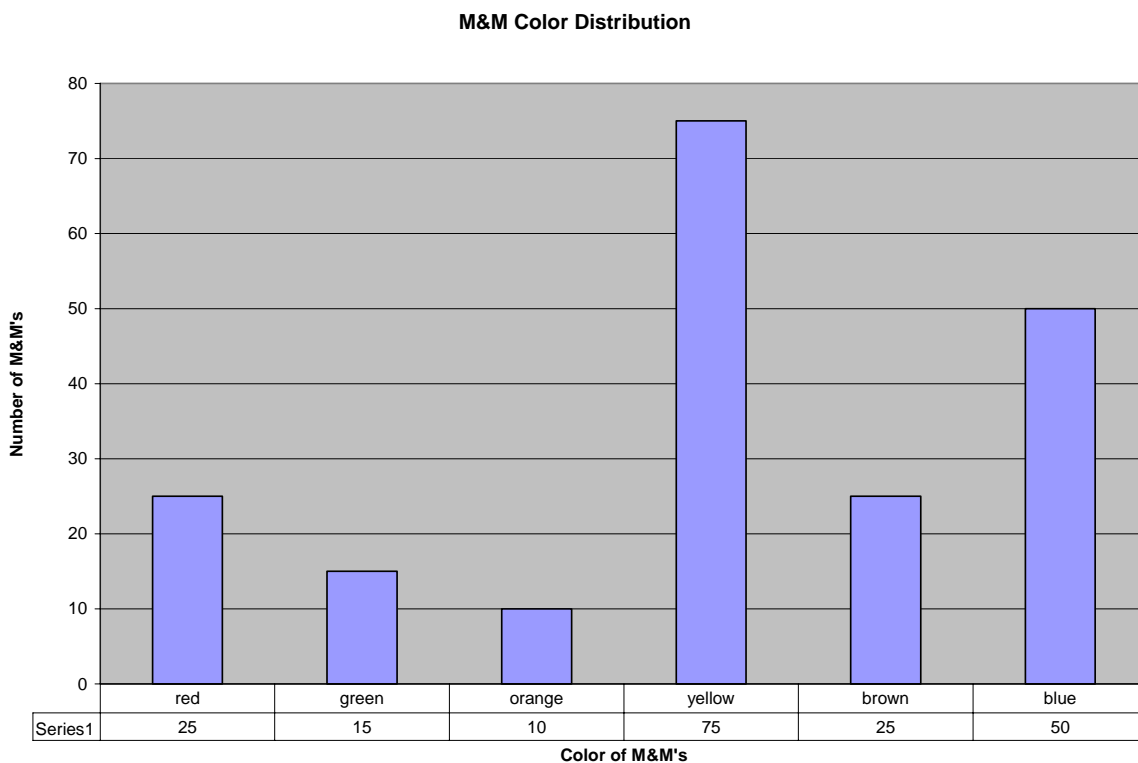


Figure 1. The number of M&M's from one bag shown by color. A total of 200 M&M's were counted for this investigation.

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.

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