

# *Glen A. Wilson High School*

16455 Wedgeworth Drive - Hacienda Heights, CA 91745 - (626) 934-4400 - Fax (626) 855-3792

August 26, 2009

Dear Parents and Students,

In order to make expectations clear for the students, the teachers in the Science Department have given each student a set of very important instructions.

Each teacher will go over and explain these guidelines with the students. The teachers will also explain any additional expectations required in the classes. All of the guidelines are posted on the **WEB**. Schedules of assignments may also be posted. See your teacher for this.

Students in Science are now ***required*** to access certain assignments and instructions that are posted on the **WEB**, such as assignments, pre-labs, worksheets, drawings, readings, homework, etc. Students will be expected to have these assignments ready to ***turn in on time***. Computers must be used in accordance with school and classroom rules and procedures.

Biology AP will require some lunch periods to do labs and may require some Saturdays to finish lab work.

Mr. Gunther's website is:

***www.gunthersclass.com***

Please review these guidelines with your son/daughter and have them return this tear off on the day assigned. Feel free to call if you have any other questions or comments. Thank you for your time and concern. (626) 934-4520.

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Tear Off and Return on date assigned

We have reviewed the course guidelines.

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Student's Name (Print)

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Date

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Student Signature

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Parent Signature

# Glen A. Wilson High School

## AP Biology Syllabus

(Note: for a more detailed Syllabus see web site)

[www.gunthersclass.com](http://www.gunthersclass.com)

**Required Text:** Biology, 7<sup>th</sup> Edition. Campbell

### Supplementary Texts and Manuals:

- Campbell, Neil A., J. Reece. *Practicing Biology – A Student Workbook*, 7<sup>th</sup> edition (2005)
- Tortora, Gerard J., Derrickson, Bryan. *Principles of Anatomy and Physiology*, 11<sup>th</sup> edition (2006) (used in Physiology)
- Martini, Frederic H. *Fundamentals of Anatomy and Physiology*, 4<sup>th</sup> edition (1989)
- Donnelly, Patricia J., Wistreich, George A., *Laboratory Manual for Anatomy and Physiology*, 3<sup>rd</sup> edition (1990)
- **Suggested:** Cliff's AP Biology Test Prep or other supplementary guides (optional)

### Websites:

[www.gunthersclass.com](http://www.gunthersclass.com)

[www.collegeboard.com](http://www.collegeboard.com)

### Course Description:

The AP Biology course is designed to be the equivalent of a college introductory biology course usually taken by biology majors during their first year. The content and curriculum fall under the guidelines of the College Board ([www.collegeboard.com](http://www.collegeboard.com)) and the Educational Testing Service. After showing themselves to be qualified on the AP Examination, some students, as college freshmen, are permitted to undertake upper-level courses in biology or to register for courses for which biology is a prerequisite. Other students may have fulfilled a basic requirement for a laboratory-science course and will be able to undertake other courses to pursue their majors.

This course will include those topics regularly covered in a college biology course for majors. The college course in biology differs significantly from the usual high school course in biology with respect to the kind of textbook used, the range and depth of topics covered, the kind of laboratory work done by students, and the time and effort required of students. The goals of this course are to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology.

In the attempt to develop unifying constructs in biology, the AP Biology Development Committee has identified eight major themes that recur throughout the course. These themes can be applied across the entire curriculum and serve to unify the content to assist students in organizing concepts and topics into a coherent conceptual framework.

### Major Themes

- I. Science as a Process
- II. Evolution
- III. Energy Transfer
- IV. Continuity and Change
- V. Relationship of Structure to Function
- VI. Regulation
- VII. Interdependence in Nature
- VIII. Science, Technology, and Society

The course is highly demanding. Students must develop advanced independent study habits... The course requires a **commitment to reading** and great deal of text and supplemental material. All students are **required** to take either the **AP Exam or the IB Exam** and points will be factored in. They must have **internet access** for research and the printing of class materials. **Lab report writing** is essential and is an essential part of the curriculum. Finally, time outside of the class is required for labs and activities, which will be conducted at lunch or on Saturdays.

### AP Labs

The experiments in AP are college level in approach. There are 12 labs that are required by AP and information from them will be included on the exam. There will also be additional labs which are appropriate to the content. Since there is an emphasis is on acquiring college skills and self-directed behavior, there will be labs that are designed and planned by

the students. IB requires at least two of these during the IB Bio curriculum. Please note that AP and IB are very demanding. Students must be prepared in advance of the labs and they may require out of class time, such as lunch, before school, after school, and **Saturdays**. The following is a list of the required AP Labs. We will do most of them and additional labs.

- AP Lab #1 Osmosis & Diffusion – Ward's 2006
- AP Lab #2 Enzyme Catalysis - Ward's 2006
- AP Lab #3 Mitosis and Meiosis
- AP Lab #4 Plant Pigments and Photosynthesis – Ward's 2006
- AP Lab #5 Cellular Respiration – Wards 2007
- AP Lab #6 a. Transformation of E. Coli – Wards 2006
- AP Lab #6 b. DNA Fingerprinting – Wards
- AP Lab # 7 – Genetics of Organisms
- AP Lab #8 Population Genetics and Evolution
- AP Lab #9: Transpiration - Wards
- Lab: AP #10 – Physiology of the Circulatory System
- Lab: AP Lab #11 Animal Behavior
- Lab AP Lab #12 Primary Productivity

### The Examination:

The test is 3 hours in length. The first session is 90 minutes long and consists of 120 multiple choice questions. (There is a penalty for incorrect answers, so it isn't wise to guess, unless you can narrow your choices!) The second half of the exam is another 90 minute session during which the student must answer four free response essay questions. All four must be answered. The AP biology course will help students develop strategies for answering both the multiple choice questions and the essay questions. The fee for the test has been \$75 but is subject to change.

### College Credit:

AP examination scores range from 1 to 5. It is very important to remember that different universities use different criteria for awarding AP credit. Even scores from different AP examinations (i.e. bio, French, government) are interpreted differently within the same university. Therefore, it is very important to look carefully at the guidelines for AP credit in the catalogs of the schools in which you are interested. Depending on the AP score achieved, some schools will offer credit for an introductory course and other schools may exempt the student from the course(s) but not award the credit hours. In general, a 3 is passing for college credit.

### Topic Outline:

The material in the AP biology course is distributed to match the breakdown of questions on the **AP examination**, which is as follows

- I. **Molecules and Cells (25%)**
  - A. **Chemistry of Life (7%)**
    1. Water
    2. Organic molecules in organisms
    3. Free energy changes
    4. Enzymes
  - B. **Cells (10%)**
    1. Prokaryotic and eukaryotic cells
    2. Membranes
    3. Subcellular organization
    4. Cell cycle and its regulation
  - C. **Cellular Energetics (8%)**
    1. Coupled reactions
    2. Fermentation and cellular respiration
    3. Photosynthesis
- II. **Heredity and Evolution (25%)**
  - A. **Heredity (8%)**
    1. Meiosis and gametogenesis
    2. Eukaryotic chromosomes
    3. Inheritance patterns

- B. Molecular Genetics (9%)**
    1. RNA and DNA structure and function
    2. Gene regulation
    3. Mutation
    4. Viral structure and replication
    5. Nucleic acid technology and applications
  - C. Evolutionary Biology (8%)**
    1. Early evolution of life
    2. Evidence for evolution
    3. Mechanisms of evolution
- III. Organisms and Populations (50%)**
- A. Diversity of Organisms (8%)**
    1. Evolutionary patterns
    2. Survey of the diversity of life
    3. Phylogenetic classification
    4. Evolutionary relationships
  - B. Structure and Function of Plants and Animals (32%)**
    1. Reproduction, growth, and development
    2. Structural, physiological, and behavioral adaptations
    3. Response to the environment
  - C. Ecology (10%)**
    1. Population dynamics
    2. Communities and ecosystems
    3. Global issues

**Grading Policy:**

- Tests and Quizzes: 70%
- Homework, Labs, and Projects 30%

**Required Materials in class everyday:**

- Test book – Covered
- 3 ring binder – See notebook instructions
- Spiral bound, quad ruled notebook – See notebook instructions.
- Calculator
- HLPUSD Lab-top
- Paper – graph, lined, etc.

**Course Outline bu Units:**

- Unit 1 Chapters 2,, 3, 4, 5 - Chemistry
- Unit 2 Chapters 6 & 7 - The Cell
- Unit 3 Chapters 8 & 9 – Metabolism and Cellular Respiration
- Unit 4 Chapters 12 & 13 – Cell Reproduction
- Unit 5 Chapters 14 & 15 – Genetics
- Unit 6 Chapters 16 & 17 – DNA, RNA, and Protein Synthesis
- Unit 7 Chapters 18, 19, 20 – Genes and Genomes
- Unit 8 Chapters 22, 23, 24 – Evolugion
- Unit 9 Chapters 25, 26, 27, 28 – Diversity
- Unit 10 Chapters 29, 30, 31 – Plants I
- Unit 11 Part A Chapters 10, 35, 36; Part B Chapters 37, 38, 29 – Plants II
- Unit 12 Chapters 32, 33, 34 – Animal Diversity
- Unit 13 Human Evolution
- Unit 14 Chapters 50, 52, 53, 54 Ecology
- Unit 15 Chapters 40 – 49 Physiology

## WILSON HIGH SCHOOL - SCIENCE: COURSE GUIDELINES

(Additional rules, policies, and procedures will be given to students by teachers)

### I. CLASS ORGANIZATION

- A. **Seating:** Students will be given seats by alphabetical order. They are expected to be in their seats **before the bell rings** and remain in their seats unless given permission to get up.
- B. **At the beginning** bell and during the period, only class materials should be out. Put other materials and personal items away!!
- C. Students must **be in their seats** and the class must be in order before dismissal. All materials must be put away. Wait until officially excused before getting out of your seat or leaving the class.
- D. TAKE NOTES EVERYDAY.
- E. **DO ALL OF YOUR OWN WORK.** This includes **LAB REPORTS**. These are individual reports. Lab groups are for lab-work only.
- F. CHEATING AND COPYING of another student's work is strictly forbidden. **This includes electronic files.** The result will be loss of credit, referral and parent contact.
- G. **DO ALL OF YOUR HOMEWORK.** All homework is important and will contribute to your learning and final grade.
- H. **BEHAVIOR AND LEARNING PROBLEMS WILL BE REFERRED TO THE OFFICE.** Parents will be notified.
- I. Learning is your responsibility. **You** must put time, energy, and effort into it. Understanding comes from the time and effort spent.
- J. **USE COMPUTERS** only when given **permission** by teacher and only in the way specified by teacher. Students are **not allowed to share computer disks or files.** This is considered **cheating.** See **"Computer Code and Policies."**
- K. If you need assistance **GO SEE YOUR TEACHER.**

### II. ATTENDANCE

- A. Tardies: you are expected to be in your seat **when the bell rings**, otherwise you will receive a tardy.
  1. You will lose credit for activities occurring the time you are tardy, including turning in homework.
  2. You will lose time and disrupt the class, which will affect your **participation grade.**
  3. Tardies will be referred according to school policy.
- B. (Regular school, only - not Summer School). **Absences** must be cleared in the office **before** school. You must bring an absence slip from the office on the day you return. If you come in late or are sent out to get an absence slip, you will receive a tardy.

### III. MATERIALS

- A. Materials required for class **EVERYDAY:**
  1. **NOTEBOOKS:** 3 RING BINDER - place homework notes, lab reports, tests, and quizzes into sections, using dividers. SPIRAL BOUND - quadra ruled notebook, follow directions given by your teacher.
  2. **TEXTBOOK:** COVERED, LAB MANUALS, PEN, PENCIL
  3. **LINED PAPER** (ALL CLASSES), **GRAPH PAPER** (IPS, CHEMISTRY, PHYSICS, PHYSIOLOGY, BIOLOGY), **PLAIN PAPER** (BIOLOGY, PHYSIOLOGY)
- B. Other materials such as compasses, gloves, rulers, insect pins, etc., will be required by your teacher. These will be announced.

### IV. GRADES

- A. Grades will be based on a cumulative point system: **A=90+, B=80+, C=65+, D=55+, F=<55.**
- B. Keep an assignment sheet and a record of your grades. **Keep track of your own grades and progress.**
- C. Grades are earned according to the point system. Do not argue about your grade. If you keep track of your points, you may discuss errors. Periodically your teacher will show you your total.
- D. Your **attitude and participation** are an important part of your ability to learn. Your teacher wants to see a "can do" attitude. A significant **participation grade** will be given based on attitude and participation in class activities.
- E. Work will be weighted: AP Bio – 30% HW, 70% Tests. Honors Physiology – 35% HW, 65% Tests.
- F. All work is due at **the BEGINNING OF THE PERIOD.** All work must be complete, **INCLUDING NAME AND TITLE.** Do not wait to the last minute and attempt to finish work in class before the bell rings or after the class has started.
- G. **DO ALL WORK IN PEN**, unless otherwise notified. All work must be neat, complete, and organized. All work must have a proper heading with name, date, period, class, and a title. AP Biology - NO LATE WORK. Honors Physiology – 50% credit up to 2 days late.

### V. MAKE-UP (Regular School, only - not Summer School)

- A. The following conditions apply:
  1. If you are absent on the day an assignment is due, you may turn it in on the day you return.
  2. All assignments are posted on the web and must be turned in when they are due.
  3. If you are in school, but not class you must do the following: See your teacher that day for all class and homework. **TURN IN ALL HOMEWORK DUE THAT DAY.**
  4. Labs will not be made up.

### VI. CLASSROOM BEHAVIOR

- Be courteous at all times to all teachers, staff, students, visitors, etc.
- No profanity, No graffiti, No hats, Do not write on desks, walls, etc
- Raise your hand, otherwise remain quiet, until it is your turn.
- FOLLOW ALL SAFETY INSTRUCTIONS.
- Do not leave your lab station.
- Do not use or handle materials or equipment without permission.
- Clean lab stations and return all materials.
- Do not throw any object.
- Broken items must be paid for.
- No eating in class, without permission. Water only.
- Do not expect locker or bathroom passes. Plan ahead. Tardies are not excused for locker or restroom stops.
- Remain seated unless given permission to get up.
- The use of cell phones is prohibited during class and while on a hall pass.

# *Wilson High School Science Department*

## COMPUTER CODE AND POLICIES

Computer usage and security will be governed strictly in accordance with classroom rules, school and district rules and policies, and the laws of the State of California and the Federal Government.

1. **Students may not** use any computer without permission. **Students may not** turn on or use a computer without permission. The presence of computers in the classroom is not in itself permission to use them.
2. If given permission to use a computer, students must use that computer for only the assigned task. **Students may not** access or otherwise use any files, programs, software, email, internet, or any other feature (including computer set-up features, such as the bios or control panel) without specific permission. **Computers must be used for the specific purpose of the given lesson, lab, or activity.**
3. If given permission to use the classroom network or HLPnet, students may not access any file, program, software, email, internet, or any other feature (see #2) without specific permission. **Computers must be used for the specific purpose of the given lesson, lab, or activity.**
4. Students must use the computer they have been assigned. **They may not**, without permission, use any computer other than their assigned computer.
5. **Students may not** print out documents without permission.
6. **At no time** may a student enter the "set-up" or "control panel" or in any manner change any feature on the computer. Only the teacher or other system administrator will make such changes.
7. **At no time** may a student insert or attach any storage device, such as floppy disks, "cigars", external drives, CDRs, etc., to a computer without permission. Students may not save or copy any data from a computer without permission. **This is a serious violation of computer security. This includes photographing the screen without permission.**
8. **California Penal Code:**
  - According to the California Penal Code Section 502, subdivision (c), paragraph 2, "...any person who commits any of the following acts is guilty of a public offence:
  - Knowingly accesses and without permission takes, copies, or makes use of any data from a computer, computer system, or computer network, or takes or copies any supporting documentation, whether existing or residing internal or external to a computer, computer system, or computer network."
  - Students doing so will receive a zero (0) on the given assignment and will be subject to discipline, including that stipulated by law.
7. **At no time** may a student, without permission, use a computer for personal purposes.
9. Each student is responsible for doing **his/her own work** at all times, whether written or on computer. **At no time** will a student copy by hand or photocopy another student's work to turn in. **At no time will a student share computerized data or text with another student.** This means you may produce data or text on the computer **for yourself only**. Sharing of data files, without permission, for the purpose of doing homework, lab work, or any assigned activity is prohibited. If students get data (graphs, tables, etc.) or text from another student, it will be considered cheating and both students will receive a zero (0) on given assignment.
10. Each student is responsible for any violation on his/her assigned computer. If working in groups of two or more, all students should be paying attention to the computer they are assigned to and any and all activities on that computer. All students working on a computer are responsible for any and all activities on that computer, including violations.
10. Keep all chemicals and food away from computers and keyboards.
11. If you have a problem **tell the teacher** immediately.
12. Students in Science are now **required** to access certain assignments and instructions that are posted on the **WEB**, such as pre-labs, worksheets, drawings, readings, etc. Students will be expected to have these assignments ready to turn in on time. For those students without computers at home, there are on-line computers in the library. They may also get a printout or a copy from a friend. Computers are also available in classrooms **at certain times**.
13. Students may now have their own district assigned computers. They are expected to bring them to class everyday and will use them according to the rules listed above and additional rules specific to their use.

# *Wilson High School Science Department*

## Notebook & Homework Requirements

*www.gunthersclass.com*

Students are required to organize their work into a **3 ring binder**. **Notes and class work will be kept in a quad-ruled, spiral bound notebook**. Separate homework will be collected on a daily basis.

**I. 3 RING BINDERS:** Students are to organize all loose work into a 3 ring binder. Work is to be in chronological order. Bring notebooks to class everyday. Use section dividers and have at least the following sections properly labeled:

### Notebook Sections

1. Assignment sheets (Check the web every day.)
2. Homework and worksheets
3. Labs
4. Handouts.(Xeroxes and print-outs)

**II. QUAD-RULED, SPIRAL BOUND NOTEBOOK:** A great deal of homework and class-work will be written into this notebook. FOLLOW DIRECTIONS.

1. Date every day's work. TAKE NOTES EVERYDAY. Your notebook is like a journal. Highlight the date with a yellow marker. Notes may be taken in pencil or pen.
2. Homework and class-work assignments are to have titles and headings like assignments that are handed in. This includes a Title, Your Name, Date, and Period. Highlight the title with a yellow marker. Each separate assignment requires a title. Computer notes, video notes, and special activities fall in this category.
3. Do not paste anything in your notebook without permission.
4. Do not break up assignments. Keep them together. This requires planning.
5. Bring quad-ruled notebooks to class **everyday**.
6. Notebooks will be collected periodically to record these marks. Do not lose your notebook!! If you fill a notebook, get a new one.

### **III. HOMEWORK**

**All homework must be written in INK. Exceptions: Drawings and graphs must be in pencil.**

1. Questions and answers must be written out.
2. All homework must have a Name, Date, and Period in the upper right hand corner of the first page.
3. All homework must have a title. If the homework is unit questions, the unit or chapter and the question numbers must be given. E.g., Chapter 1, Questions 1 – 10.
4. All work must be completed at home and turned in at the beginning of the period, INCLUDING NAME, DATE, PERIOD, AND TITLE.
5. Any work not completed at the beginning of the period will be considered late. This includes name, date, period, and title.
6. Work turned-in after being tardy will be considered late.
7. Lab reports must have a title page. (See web)
8. All returned homework must be placed in 3 ring binders in proper section.

## Pre-Lab Instructions

**WITHOUT A COMPLETE PRE-LAB, YOU WILL NOT DO THE LAB!!**

**The importance of preparation** Before you conduct a laboratory investigation, you *MUST* be properly prepared. You must know the purpose of your investigation, the materials you will use, and the procedure you are going to follow, and the data you will collect. In addition to the goal of running the experiment successfully, you also must do so *safely*. A Pre-Lab done correctly demonstrates your preparedness to do the lab and your ability to follow directions.

**Requirements:** A *complete* Pre-Lab is REQUIRED. Without a complete Pre-Lab a student will not participate in the experiment. *Pre-Labs are homework* and must include the following: **I. Purpose, II. Hypothesis, III. Materials, IV. Flow Chart, V. Data Tables.**

### **I. Purpose**

The major goals and objectives must be stated in your own words. There is also a **research questions**. For example: What is the effect of melting ice on it's mass?

### **II. Hypothesis:**

This is a specific *prediction* of the outcome of your experiment. It should be in the form of an ....*if, then...* statement. For example: *If* an ice cube is melted, *then* its mass will go down.

### **III. Materials:**

**List and number** all of the equipment and materials to be used.

### **IV. Flow Chart:**

This is the procedure in the form of a Flow Chart. **See Flow Chart instruction**

### **V. Data Tables:**

If you understand the lab you are about to do, you will be able to make a correct table to collect the data. The table should have a correct heading. It should include rows and columns with appropriate headings. If you do not include a data table, you will not do the lab. *See lab report instructions.*

### **Reminders:**

1. All work will be done in ink.
2. Use rulers to make straight lines.
3. Each Pre-Lab requires a correct title
4. You must have your name, date, and period in the upper right of the paper.
5. REMEMBER - WITHOUT A COMPLETE PRE-LAB, YOU WILL NOT DO THE LAB.
6. *Do not* use the Pre-Lab in the final **Lab Report**. They are separate assignments.

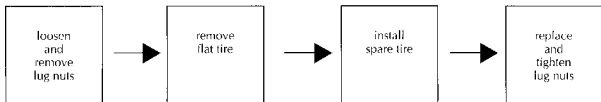
# Graphic Organizing: Flow Chart

Terms like *photosynthesis* and *reproduction* refer to biological processes that involve a number of steps. Sometimes there are so many steps in a process that it's difficult to remember all of them, let alone the order in which they occur. You can minimize your confusion, however, by using a flow chart to diagram such terms. The same flow chart will also help you understand how each step in the process builds on the preceding one and lays the groundwork for the next.

Lab procedures are easier to implement if you summarize them in a flow chart before you begin. The instructions in your textbook and in your lab manual include a wealth of detail designed to help you prepare for the lab. However, these same details can distract you when you are in the middle of an experiment and you want to know what to do next. If you have diagrammed the experiment with a flow chart, you can ignore the details and focus instead on the procedure itself.

A flow chart consists of a series of boxes strung out in a line across the page. When necessary, the line of boxes continues on the next line. An arrow points from the first box to the second, another points from the second to the third, and so on, all the way across the chart. Each box contains a word or a phrase that summarizes one step in a sequence of steps. The arrows indicate the order of events. Details that explain and elaborate are not included in the chart. A title identifies the process or procedure diagrammed in the chart. These characteristics are all illustrated in the following example.

## CHANGING A FLAT TIRE



### How to Construct a Flow Chart

1. List the steps in the process or procedure you want to diagram. Do not include details that explain or elaborate.
2. Number the steps.
3. Construct a series of boxes equal in length to the number of steps in the process or procedure.
4. In the first box, summarize the first step in the process or procedure with a word or a phrase.
5. Insert a right arrow following the box.
6. Repeat Steps 4 and 5 until all the boxes are full. Omit the arrow following the last box in the series.
7. Add a title that identifies the process or procedure.

# Writing Successful Lab Reports

Note: Do not use your pre-lab in the lab report. Do your own work. Do not copy.

I. **INTRODUCTION:** Use at least 3 paragraphs.

**A. Paragraph 1.**

1. **Background information:** Information from **text** pertaining to the topic and research question. Summarize **relevant** information in your own words. Do not Copy! No internet. No encyclopedias.
  - a. Example: Discuss photosynthesis and the production of glucose in relation to plant growth.

2. **Research Question:** A statement in the form of a question that describes what you want to find out. Highlight the research question in yellow.

**B. Paragraph 2.**

1. **Variables:**
  - a. Describe the **independent (experimental) and dependent variable**.

**C. Paragraph 3.**

1. Give **control variables:** variables which are kept constant. Describe **all**, giving specific information, e.g., times, temperatures, masses, environment, etc. BE SPECIFIC.

II. **PURPOSE:** Use 2 paragraphs.

**A. Paragraph 1.**

1. Re-state the research question as a **purpose**.
  - a. E.g., The purpose of this lab is to determine the effect of blue light on plant growth.

**B. Paragraph 2.**

1. **Hypothesis:** Use an ...if, then...statement as a prediction of the effect of the **independent variable** on the **dependent variable**. This is a cause and effect relationship. Highlight the hypothesis in yellow. Use a measurable dependent variable.
2. **Explain** the hypothesis. Use specific information from the text book.

III. **MATERIALS:** List and number all materials used. Do not include anything that was listed in the hand-out, but was not used.

IV. **PROCEDURE:** List and number each step. State the procedure in the **past tense**. Do not use a flow chart. **Do not Copy.**

V. **DATA:** This section includes Tables, Graphs, Drawings, and calculations. **PLACE ALL DATA HERE.** Any data out of order (e.g., at the back of the report) will not be counted. Data must be done by hand.

**A. Tables:** .Must be done by hand. Place all tables in sequence.

- a. Label on the top as Table 1. Title, etc.
- b. Tables should be done in ink. **Tables may not be done on computer.**
- c. Tables should be fully enclosed. Use a ruler.
- d. **Data must have correct significant figures, units, scientific notation, and uncertainties.**

**B. Calculations:** Place calculations under each table where calculations are listed. **Data must have correct significant figures, units, scientific notation, and uncertainties.**

**C. Graphs:** Must be done by hand. Place graphs in sequence..

1. Label on the bottom as Figure 1. Titles, etc.
2. Graphs may be done in ink or pencil. **Graphs may not be done on computer**
3. Fully label axes.
4. Graphs should be at least ½ page.

VI. **QUESTIONS:** Any required questions go here.

VII. **CONCLUSION:** This is **very important**. This should be **at least** 3 paragraphs.

**A. Paragraph 1:**

1. Re-state the purpose and hypothesis in the past tense.

**B. Paragraph 2:** (You may need more than one paragraph here.)

1. Was the purpose accomplished? Why? Be specific.
2. Was the hypothesis proven? Why or why not? **Draw a conclusion.** THOROUGHLY DISCUSS AND **EXPLAIN** YOUR CONCLUSION(S). In this discussion you must refer to your DATA and STATISTICS (% dev., SD, etc). **IB/AP** – Compare your results to literature results. Do not use other student's reports.
3. Site **relevant** literature. Do not use a simple or general quote. Reference must be of similar research. Do not use an encyclopedia. Make sure you use proper references and a bibliography.

**C. Paragraph 3:** Describe and discuss errors in the lab. These can be human errors, experimental errors, errors in procedure, and mistakes, etc. Do this before discussing improvements.

**D. Paragraph 4:** Discuss specific suggestions to improve the procedures or materials in the labs. Do not suggest that more time for the lab would be an improvement.

## General Guide to Formatting a Bibliography

### For a book:

Author (last name first). Title of the book. City: Publisher, Date of publication.

EXAMPLE:

Dahl, Roald. The BFG. New York: Farrar, Straus and Giroux, 1982.

### For an encyclopedia:

Encyclopedia Title, Edition Date. Volume Number, "Article Title," page numbers.

EXAMPLE:

The Encyclopedia Britannica, 1997. Volume 7, "Gorillas," pp. 50-51.

### For a magazine:

Author (last name first), "Article Title." Name of magazine. Volume number, (Date): page numbers.

EXAMPLE:

Jordan, Jennifer, "Filming at the Top of the World." Museum of Science Magazine. Volume 47, No. 1, (Winter 1998): p. 11.

### For a newspaper:

Author (last name first), "Article Title." Name of newspaper, city, state of publication. (date): edition if available, section, page number(s).

EXAMPLE:

Powers, Ann, "New Tune for the Material Girl." The New York Times, New York, NY. (3/1/98): Atlantic Region, Section 2, p. 34.

### For a person:

Full name (last name first). Occupation. Date of interview.

EXAMPLE:

Smeckleburg, Sweets. Bus driver. April 1, 1996.

### For a film:

Title, Director, Distributor, Year.

EXAMPLE:

Braveheart, Dir. Mel Gibson, Icon Productions, 1995

### CD-ROM:

Disc title: Version, Date. "Article title," pages if given. Publisher.

EXAMPLE:

Compton's Multimedia Encyclopedia: Macintosh version, 1995. "Civil rights movement," p.3. Compton's Newsmedia.

### **Magazine article:**

Author (last name first). "Article title." Name of magazine (type of medium). Volume number, (Date): page numbers. If available: publisher of medium, version, date of issue.

EXAMPLE:

Rollins, Fred. "Snowboard Madness." Sports Stuff (CD-ROM). Number 15, (February 1997): pp. 15-19. SIRS, Mac version, Winter 1997.

### **Newspaper article:**

Author (last name first). "Article title." Name of newspaper (Type of medium), city and state of publication. (Date): If available: Edition, section and page number(s). If available: publisher of medium, version, date of issue.

EXAMPLE:

Stevenson, Rhoda. "Nerve Sells." Community News (CD-ROM), Nassau, NY. (Feb 1996): pp. A4-5. SIRS, Mac. version, Spring 1996.

## **Online Resources**

### **Internet:**

Author of message, (Date). Subject of message. Electronic conference or bulletin board (Online). Available e-mail: LISTSERV@ e-mail address

EXAMPLE:

Ellen Block, (September 15, 1995). New Winners. Teen Booklist (Online). Helen Smith@wellington.com

### **World Wide Web:**

URL (Uniform Resource Locator or WWW address). author (or item's name, if mentioned), date.

EXAMPLE: (Boston Globe's www address)

<http://www.boston.com>. Today's News, August 1, 1996.