

C₃ BONDS

VOLUME 2, ISSUE 3

WINTER 2004
YEAR 1

C₃ Year 1 Teachers Gear Up to Become a Second Year Batch!!

With the second semester of the 2003-04 academic year well underway, C₃ Year 1 folks are not only busy wrapping up their first year program requirements but already focusing on the upcoming summer sequel. Program Coordinator Cathi Cox now has the January



classroom visits under her belt with the February list rolling right along. The final workshop weekend is quickly approaching as February 21-22 looms large on the horizon.

This means deadlines are coming fast!! Therefore, each classroom teacher is currently completing the second video lesson and critique which is due at the final workshop weekend along with a professional portfolio that documents the implementation and impact of C₃ in their classrooms throughout the academic year. The final Blackboard assignment has been posted and all online work is to be finished by the end of February. Then, as the final task is checked off each



teacher's "checkbric", the time to get paperwork done in preparation for the summer 2004 Year 2 program begins! All Year 1 participants will gather as "veterans" on Sunday, June 20, to kick off the second phase of their C₃ experience. Following the same successful model as Year 1, the Year 2 component will actively

engage the teachers in intense concept development of accuracy/precision, solutions, conductivity, acids/bases, physical and chemical changes, molarity/molality, and colligative properties among others. In addition, emphasis will be placed on the history of science and key figures involved in the development of scientific information. All participants will engage in hands-on/minds-on learning experiences that



involve use of the scientific method, experimental design, process skills, and inquiry. Various aspects of the science reform movement will also be discussed, modeled, and assessed as well as teaching strategies such as cooperative learning, learning cycle, alternative assessment, and constructivism. In addition, the Year 2 participants will prepare to work with other educators during the following school year as part of the project's leadership component. So, in order to



get the ball rolling, each Year 1 participant is reminded to fill out the Year 2 application and bring it to the workshop weekend in February along with the other necessary items. Applications can be downloaded from the C₃ web site or applications completed online by visiting <http://c3.latech.edu>. Be sure to get in touch with Cathi if there are ques-



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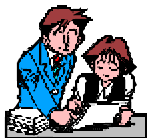
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C₃ ISSUES A PUBLISHING CHALLENGE!!

With most science fairs completed and students investigations well underway throughout the academic year, C₃ reminds its teachers that an opportunity for their students' work to be published is only a simple submission away!! With Cathi in the classrooms seeing the caliber of work that the students are doing, there is no doubt that they are in an excellent position to have their work published in the first edition of Louisiana Tech University's Student Research Journal. And with most of the work already completed with their experimental design lab reports, only some minor additions and edits will be needed to have the work ready for submission this spring. The deadline for submitting student work is April 2, 2004



which gives the students ample time to not only get their science fair papers ready for submission, but a chance to even conduct a new investigation and submit its report. Those

folks who attended the LSTA C₃ workshop will remember the simple steps outlined to guide a student in the preparation of an simple research report. What an excellent opportunity for the students, and your school, to have their work published and on record for others to study and learn from. And what wonderful publicity for you, your students, the school, and school system to have such a feather in your cap. So, the challenge is extended to each C₃ teacher to have at least ONE student submit a research report by the April 2 deadline. And as an incentive for you, for each student paper that is submitted from your classroom, your name will go into a special drawing for a truly fabulous prize. **DON'T MISS THIS OPPORTUNITY**—your students will forever thank you for enabling them to accomplish such an exciting and rewarding task that could open all kinds of doors for them as well as you!!



C₃ "TO DO" LIST

Have you completed the following tasks?!?!

- Completed all Blackboard assignments
- Begun work on your professional portfolio
- Completed both video lessons and critiques (one each semester)
- Turned in all required paperwork
- Completed a Year 2 application



Let Cathi know if you have questions or concerns!!!

MARK YOUR CALENDARS NOW!!



Dates To Remember:

February 21-22, 2004: Year 1 Workshop Weekend #2

April 2, 2004: Deadline for Student Submission for the Research Journal

June 20-July 2, 2004: C₃ Year 2 Summer Institute

LOOK FOR EXPERIMENTAL REPORT GUIDELINES FEATURED ON PAGE 10 OF THE NEWSLETTER

HAPPY
VALENTINES
DAYS
FROM THE C₃
TEAM!!



BREAKING DOWN THE BOARD

Year 1 C₃ teachers are currently engaged in completing four online assignments as their Blackboard experience continues. With 100% of the Year 1 participants successfully completing the Learning Cycle assignment and discussion, 88% have addressed Assignment #2 which stems from the first video lesson and critique that each teacher was required to complete during the first semester of the 2003-04 academic year. Assignment #3 is entitled "Strategy Sampling" and provided teachers with a forum for discussing the different strategies from the C₃ project and how they have been used in the classroom. The discussion was guided by the following questions: *outside of the learning cycle, what strategy/assessment has yielded the greatest success in your classroom and why do you think it has been so successful, what strategy (or strategies) have you tried that you feel will need a stronger focus when used again, are there specific reasons why you felt the strategy was not as success-*



ful as you had hoped and are you hesitant to try again, are there any strategies/assessments that you absolutely have NOT attempted and can you provide a reason why you are hesitant in using them, can you think of any strategies or assessments that we have not worked with in C3 that you would like to see emphasized in the future? 54% of all Year 1 folks have completed the third assignment and 20% can boast a clear slate with the fourth and final assignment done as well. The final topic deals with an "Impact Analysis" of the C₃ project in each teacher's individual experience. Teachers are carefully considering which components of the project have been most beneficial as well as the magnitude of growth that each has experienced professionally. Cathi appreciates the excellent job that everyone is doing with the online learning community and encourages each Year 1 participant to get busy now in order to be sure that ALL assignments are completed by the end of February 2004!



2004 CLASSROOM VISITS ARE RIGHT ON TRACK!!

UNBELIEVABLE—that's the only way to describe the job that our C₃ folks are doing in the classroom!! With the emphasis on the learning cycle practically ingrained in everyone's thinking, the natural ease with which each teacher is progressing and implementing the different learning experiences and assessments from the project is simply **AMAZING!!!** Cathi reports that it has been such a joy to see what a tremendous job the Year 1 crew is doing in the field—you



continue to make us ALL look good!! Remember that we'll be looking for a comprehensive summary of what you've tried during the year when we get together at the last workshop, so now's the time to try something new! And if you need help or support, remember Cathi is just a mad dash away!! Don't hesitate to call as she works her way through the last month of visits—she'll be coming your way soon! Keep up the good work everyone . . . YOU are the heart of C₃!!



WISHING YOU LOTS OF MARVELOUS MARDI GRAS MADNESS!!





SPOTLIGHT ON C₃ SUCCESS



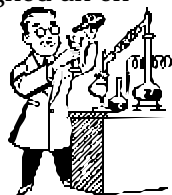
Brenda Lofton, A.E. Phillips Lab School, engaged her students in a study of classification that was both challenging AND fun. Students role played a living dichotomous key before working in cooperative groups to complete a Sneaker Classification. Groups then did a carousel throughout the room to identify different shoes in each group's classification scheme. From there, the students did a more advanced classification key with potato chips. Way to hammer those process skills **Brenda!!** . . . **Michelle Hopkins, Ruston High School**, also had her students



engaged in the use of process skills as they observed water drops on pennies, with and without soap! She then guided the students into a more in depth look at experimental design and emphasized graphing as well. Super! . . . **Chris Baker, Choudrant High School**, designed an entire lesson on physical and chemical properties and change using a stuffed Barney toy! Using effective demonstration and questioning techniques, he engaged the students in a complete learning cycle that was both enlightening and entertaining.



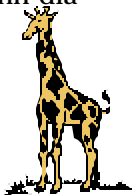
Chris also shares that he used silent brainstorming when covering safety with his students and it was terrific. Great!! . . . **Oretha Whitley, Lincoln Elementary School**, used foldables and Venn diagrams to help her students grasp concepts and terms related to a study on weather fronts. Students prepared sticky notes that corresponded to main ideas and then placed them in a large Venn diagram placed on the board. Excellent! . . .



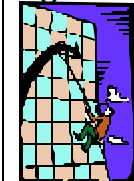
Jimmie Bond, Rayville High School, brought back materials from an LSTA short course and implemented them directly into his classroom. His students explored concepts in genetics using random penny tosses and baby giraffes while completing Punnett Squares. Wonderful! . . . **Tommy McFarland, Woodlawn Junior High School**, has an entire wall in his classroom developed into a "3D Bulletin Board" that features mini boards his students developed from experimental design experiences complete with full data collection and graphs. **Tommy** also used a card sort as a culminating assessment on the periodic table with no other test



being given. Fantastic! . . . **Lamar Cranston, Pinecrest Middle School**, also implemented silent brainstorming into his classes and shares that it worked beautifully. In fact, he reports that it threw his planning off because he didn't expect his students to get as deeply into their thinking as they did! **Lamar** also incorporated a carousel into his lab on flower parts with each station representing a different task for students to complete as they explored flower structure. Wonderful! . . . **Cathy McCartney, West Feliciana High School**, challenged her physical science students to complete amusement park design projects and the finished products were exciting. In addition, her students worked collaboratively to complete demonstrations that illustrated concepts related to force. Terrific! . . . **Jan Cosey, Thurgood Marshall Middle School**, had her students work cooperatively in an exploration that focused on "Sticky Shoes" as she guided her students toward an understanding about friction and force. **Jan's** students have also been involved in lots of graphing with their work posted prominently in her classroom. Fantastic! . . . **Christina Istre, Breaux Bridge High School**, shares that she used the card sort from the C₃ LSTA workshop to introduce lab report format and says it made her life so EASY!! According to **Christina**, what would have taken 45 minutes to explain took less than 10 minutes with the STUDENTS doing the explaining. Now that's the way to go!! And the process is paying off—experimental reports are now a core part of her classes and **Christina** reports that the students are doing a super job. GREAT!!! . . . **Trish Tidwell, Dan F. Long Middle School**, indicates that her students are just finishing up wicked stuff like replicating the digestive system with a banana and a baggie to show the mechanical and chemical process. Plus, another class is preparing to teach the respiratory system to a group of aliens. Now that should be interesting! Wonderful!! . . . As can be seen, the C₃ gang continues to shine in the classroom and no doubt their students are the better for it. Thank you for your continued hard work—you are an inspiration to us all!!

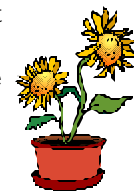


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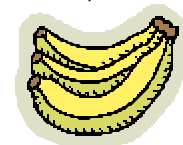
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CONGRATULATIONS

C₃ congratulates **Michelle Woodruff, Huntington High School**, on being nominated by her students as the Teacher of the Week for the local television station. What an honor! In addition, **Michelle** has been tapped as one of the teachers from her school to participate in the big Caddo Parish Science/Literacy Grant Project. She will work with her librarian to update science books and videos in the library in an effort to improve student literacy by increasing their reading level. For her work with the project, **Michelle** will receive a 36" Dell TV with cart as well as a Dell Computer with wireless internet and remote keyboard attachments. Her VCR, DVD, and laser disc can all be run through the system and the TV screen used as the computer display for powerpoint presentations and more. How exciting! And **Michelle** shares that her students are beyond excited about the new addition to the classroom. Wonderful news!!!



We Do Extra Curricular, Too!



Chris Baker, Choudrant High School, is getting ready to kick off the outdoor Track and Field season, looking for title gold like that earned during Cross Country season . . . **Christina Istre, Breaux Bridge High School**, is currently working to train her students for the upcoming Science Olympiad competitions to be held in Lafayette the first weekend in March . . . **Lamar Cranston, Pinecrest Middle School**, continues his duties as Basketball Coach while **Tommy McFarland, Woodlawn Junior High School**, is now engaged in his role as Softball Coach. Thanks to everyone for your continued hard work—your efforts are appreciated by your students and respected by C₃.



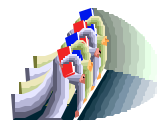
FREE AT LAST, FREE AT LAST!!!

Trish Tidwell, Dan F. Long Middle School, happily reports that she is now completely finished with chemotherapy, radiation, and any other type of chemical treatment that her cancer required. So, she truly is “drug free at last”!!! How wonderful! With only her monthly doctor appointments to maintain, **Trish** can now focus on getting back to a more “normal” lifestyle, especially now that the doctors have given her a clean bill of health. **Trish** extends her heartfelt thanks to her C₃ colleagues and buddies for their support and encouragement as she worked her way through this little dip in the road. Like the old saying goes, there certainly is “safety in numbers”!! Thanks everyone and CONGRATULATIONS **Trish**!!



COLLABORATION IS THE KEY!

Chris Baker, Choudrant High School, teamed up with **CHS** colleague Lori Varner, a C₃ Year 2 participant, to completely reorganize the science stock room. Both teachers report that although a HUGE chore, it is wonderful to finally have everything not only in its place, but arranged according to the Flinn Scientific “bible”. Way to go **CHS**!!



“THE SECRET TO GETTING AHEAD IS GETTING STARTED”

PROFESSIONAL DEVELOPMENT WORK

Trish Tidwell, Dan F. Long Middle School, shares that she is in the process of completing the last two of four classes in order to get her state endorsement in Gifted and Talented Education. Her participation in two graduate classes during this semester will enable her to finish without taking a formal test so **Trish** reports that she has the pedal to the metal! C₃ wishes **Trish** the best of luck and congratulates her on her continued quest as a lifelong learner through education. You set a wonderful example for us all!



BEFORE YOU SPEAK

T is it true?

H is it helpful?

I is it inspiring?

N is it necessary?

K is it kind?



BULLETIN BOARD:

LIFE SCIENCE, premiering March 3rd on the Annenberg/CPB Channel, is the first in a three-part course series ESSENTIAL SCIENCE FOR TEACHERS. These new courses help K-6 teachers understand bedrock science concepts needed to teach a standards-based curricula. Real-world examples, demonstrations, animations, still graphics, and interviews with scientists enrich content segments. Plus, in-depth interviews with children uncover their ideas about the topic at hand.

Use the complete course for teacher education or professional development, or individual programs for content review.

<http://www.learner.org/redirect/february/lifescience1.html>

Register for LIFE SCIENCE:

<http://www.learner.org/redirect/february/lifesciregister2.html>

Graduate Credit information:

<http://www.learner.org/redirect/february/gradcredit3.html>

Genomics: Solving the DNA Puzzle

A workshop for Louisiana's High school Science Teachers, August 5 and 6, LSU Health Science Center, New Orleans

This two-day workshop for high school science teachers is designed to help teachers gain experience using biotechnology in their classroom. There is both a didactic and a hands-on component to the workshop all exercises are geared to help teachers integrate genomics into today's standards-based education.

-Topics to be covered in the workshop: gene therapy, stem cell research, bioinformatics, DNA chips, cancer genetics, pharmacogenomics and PCR.

-Housing and meals provided for workshop participants

-There is no charge for the workshop; however, enrollment is limited due to the hands on nature of the workshop, so sign up now!

Contact; Paula Gregory (504) 568-6153
pgrego@lsuhsc.edu

Check out the Presidential Awards Program by visiting www.nsf.gov/pa This outstanding program not only recognizes America's best teachers, but also provides the opportunity for these teachers to serve as models for their colleagues and leaders in the improvement of mathematics and science education. Don't miss an opportunity to be a part of this exceptional program.

NEW LEARNING RESOURCES - FREE - The Federal Resources for Educational Excellence (FREE) website makes it easy for teachers, parents, students, & others to find learning resources from more than 40 federal organizations. <http://www.ed.gov/free>

"The Secret Life of the Brain" presents a history of efforts to understand the brain, a three-dimensional tour of the brain, optical illusions, & an animation showing how magnetic resonance imaging (MRI) works. Video clips examine how the brain evolves & differs from infancy to childhood, adolescence, & through adulthood. (NSF)<http://www.pbs.org/wnet/brain>

"Galileo's Battle for the Heavens" explains why Galileo is the father of modern science, why Galileo's refractor & Newton's reflector remain the two standard types of optical telescopes today, & Galileo's big mistake. See demonstrations of his experiments, an illustrated chronology of his life, an online pendulum, & an interactive inclined plane. (NSF)<http://www.pbs.org/wgbh/nova/galileo>

"Mars Exploration Rover Mission" provides images & updates on the two Mars rovers, Spirit (which landed January 3, 2004) & Opportunity (which landed January 24, 2004). Videos & text depict the challenges of getting to Mars: testing the rovers on Martian terrain, launching the rovers, navigating their flights, bringing them into the Martian atmosphere, landing them, & getting them out of the lander cocoon. (NASA)<http://marsrovers.jpl.nasa.gov/home/index.html>

"America's Space Program: Exploring a New Frontier" tells the story of America's journey to the moon. The creation of NASA, the Apollo vehicles, & the January 1967 tragedy are part of the story. On July 20, 1969, as the Eagle lunar module approached the moon, it became clear that the computer had chosen an unacceptable landing site -- a boulder-strewn crater. With 114 seconds of fuel left, astronauts Armstrong & Aldrin overrode the computers & manually landed the Eagle. www.cr.nps.gov/nr/twhp/wwwlps/lessons/101space/101space.htm

Public and private school teachers are invited to take advantage of Louisiana Public Broadcasting's free Unitedstreaming service. With the service, teachers have internet access to more than 2,000 videos and 20,000 video clips to help enhance their classroom lesson plans. The clips cover a range of subjects and address state standards in each of the subject areas. To use this free service, teachers must have internet access and a password obtained from LBP by calling 1-800-272-8161, ext 4206 or 225-767-4206 in the Baton Rouge area. Teachers can e-mail a request to edserv@lpb.org

http://www.chemistry.org/portal/a/c/s/1/acdisplay.html?DOC=sitertools%5Cperiodic_table.html#
Great periodic table site with a shockwave table full of goodies! Plots data and does electron configurations!!

FREE AQUATIC NUISANCE SPECIES ONLINE WORKSHOP



The Dauphin Island Sea Lab in Alabama and the J.L. Scott Marine Education Center and Aquarium in Mississippi are sponsoring a free, online workshop March 8-26. Presenters Dr. Monte Graham (on jellyfish), Dr. Heather Crawford (on invasive plants), and Dr. Harriet Perry (on invasive crabs and some invasive mammals) will each host an online session as they probe different aquatic nuisance species. The three week workshop is funded by the National Sea Grant College Program. For registration materials and more information about the workshop, visit <http://www.coexploration.org/ans>

EE SHORT COURSE



In conjunction with the Louisiana Environmental Education Symposium, there is a special pre-conference event planned for February 27, 2004. The three hour short course will be held at the LPB Studios, 7733 Perkins Road in Baton Rouge, LA, and there are two opportunities to participate: the morning session from 9-12, or the afternoon meeting from 1-4. The need to develop citizens that can “think critically”, “problem solve”, and make “informed decisions” will be the focus of the short course and will use the NSTA model “Decisions Based on Science” along with the award winning Enviro-Tacklebox™ video and web program of the same title. It is being offered through a grant from the Louisiana Office of Environmental Education and in partnership with Building a Presence in Science. Up to 40 teachers and 20 pre-service teachers can attend, each receiving a small stipend along with other resources. Register by e-mailing Dot Dickinson at ddickinson@lpb.org or by calling 800-272-8161, ext 4293 or ext 4206. Respond by February 16, 2004!

\$10,000 Grants for High School Invention

Two years ago, the Lemelson-MIT Program for Invention and Innovation launched InvenTeams (www.inventeams.org), a grants initiative designed to get high school students excited about invention. At a time when school budgets are being cut, their grants give teachers and students the resources to explore practical applications of science and math, and the opportunity to have a unique, hands-on invention experience.

Grant size: up to \$10,000 each for an in-class or extracurricular/club invention project

Number of grants available: 15

Grant period: October 2004 - June 2005

Who can apply: High school science, math and technology teachers

Deadlines: Initial application is due Friday, May 7, 2004

What could your students invent with \$10,000? Apply for an InvenTeams grant and find out!

The following link to the InvenTeams web site will allow you to download the brochure and initial application, due May 7, 2004. <http://web.mit.edu/invent/www/InvenTeam/application.html>

Joshua SCHULER, InvenTeams Officer
The Lemelson-MIT Program
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fax: 617-258-8276

MIT School of Engineering



No Dentist Left Behind Act

John S. Taylor, Superintendent of Schools for the Lancaster County, PA, School District

If you don't understand why educators resent the NO CHILD LEFT BEHIND ACT . . .

The Best Dentist---"Absolutely" the Best Dentist

My dentist is great! He sends me reminders so I don't forget checkups. He uses the latest techniques based on research. He never hurts me, and I've got all my teeth, so when I ran into him the other day, I was eager to see if he'd heard about the new state program. I knew he'd think it was great.

"Did you hear about the new state program to measure effectiveness of dentists with their young patients?" I said.

"No," he said. He didn't seem too thrilled. "How will they do that?"

"It's quite simple," I said. "They will just count the number of cavities each patient has at age 10, 14, and 18 and average that to determine a dentist's rating. Dentists will be rated as Excellent, Good, Average, Below average, and Unsatisfactory. That way parents will know which are the best dentists. It will also encourage the less effective dentists to get better. Poor dentists who don't improve could lose their licenses to practice."

"That's terrible," he said.

"What? That's not a good attitude," I said. "Don't you think we should try to improve children's dental health in this state?"

"Sure I do," he said, "but that's not a fair way to determine who is practicing good dentistry."

"Why not?" I said. "It makes perfect sense to me."

"Well, it's so obvious," he said. "Don't you see that dentists don't all work with the same clientele; so much depends on things we can't control. For example, I work in a rural area with a high percentage of patients from deprived homes, while some of my colleagues work in upper middle class neighborhoods. Many of the parents I work with don't bring their children to see me until there is some kind of problem; I don't get to do much preventive work at all."

"Also, many of the parents I serve let their kids eat way too much candy from an early age, unlike more educated parents who understand the relationship between sugar and decay. To top it all off, so many of my clients have well water which is untreated and has no fluoride in it. Do you have any idea how much difference early use of fluoride can make?"

"It sounds like you're making excuses," I said. I couldn't believe my dentist would be so defensive. He does a great job. "I am not!" he said. "My best patients are as good as anyone's, my work is as good as anyone's, but my average cavity count is going to be higher than a lot of other dentists because I chose to work where I am needed most."

"Don't get touchy," I said.

"Touchy?" he said. His face had turned red and from the way he was clenching and unclenching his jaws, I was

afraid he was going to damage his teeth. "Try furious. In a system like this, I will end up being rated average, below average, or worse. My more educated patients who see these ratings may believe this so-called rating actually is a measure of my ability and proficiency as a dentist. They may leave me, and I'll be left with only the most needy patients. And my cavity average score will get even worse. On top of that, how will I attract good dental hygienists and other excellent dentists to my practice if it is labeled below average?"

"I think you are overreacting," I said. "'Complaining, excuse making and stonewalling won't improve dental health'...I am quoting from a leading member of the DOC," I noted.

"What's the DOC?" he asked.

"It's the Dental Oversight Committee," I said, "a group made up of mostly lay persons to make sure dentistry in this state gets improved."

"Spare me," he said, "I can't believe this. Reasonable people won't buy it," he said hopefully.

The program sounded reasonable to me, so I asked, "How else would you measure good dentistry?"

"Come watch me work," he said. "Observe my processes."

"That's too complicated and time consuming," I said. "Cavities are the bottom line, and you can't argue with the bottom line. It's an absolute measure."

"That's what I'm afraid my parents and prospective patients will think. This can't be happening," he said despairingly.

"Now, now," I said, "don't despair. The state will help you some."

"How?" he said.

"If you're rated poorly, they'll send a dentist who is rated excellent to help straighten you out," I said brightly.

"You mean," he said, "they'll send a dentist with a wealthy clientele to show me how to work on severe juvenile dental problems with which I have probably had much more experience? Big help."

"There you go again," I said. "You aren't acting professionally at all."

"You don't get it," he said. "Doing this would be like grading schools and teachers on an average score on a test of children's progress without regard to influences outside the school, the home, the community served and stuff like that. Why would they do something so unfair to dentists? No one would ever think of doing that to schools."

I just shook my head sadly, but he had brightened.

"I'm going to write my representatives and senator," he said. "I'll use the school analogy- surely they will see the point."

He walked off with that look of hope mixed with fear and suppressed anger that I see in the mirror so often lately.

How To Write A Simple Experimental Report

1. Title

Write a sentence that relates the independent and dependent variables that were investigated.

2. Introduction

Describe the rationale, purpose, and hypothesis for the investigation. Use three questions to guide your writing of the introduction.

- Why did you conduct the experiment? (Rationale)
- What did you hope to learn? (Purpose)
- What did you think would happen? (Hypothesis)

3. Experimental Design

Format the experimental process.

- Begin the diagram by drawing a rectangle.
- Write the Independent Variable across the top of the rectangle
- Divide the rectangle into labeled columns to represent the different levels of the independent variable.
- Indicate the number of trials in each column
- Write the Dependent Variable and constants (C) beneath the rectangle.

4. Procedure

List the steps followed to complete the investigation. Include the following:

- Materials
- Variables – include independent variable, dependent variable, variables held constant
- Step by Step Directions

5. Results

Complete a data table and an appropriate graph for the data using the following guidelines.

Data Table

- Make a table containing vertical columns for the independent variable, dependent variable, and derived quantity (average). *The independent variable is on the left.*
- Subdivide the column for the dependent variable to reflect the number of trials.
- Order the values of the independent variable-preferably from the smallest to the largest.
- Record values of the dependent variable.
- Compute the derived quantity (average).

Graph

- Draw and label the X and Y axes of the graph.
- Determine an appropriate scale for the X and Y axes; subdivide the axes.
- Plot the data points on the graph.
- Write a sentence to summarize the data trends on the graph

6. Conclusion

Describe the purpose, major finding, an explanation for the findings, and recommendations for further study. Use six questions to guide your writing of the conclusion.

- What was the purpose of the experiment?
 - What were the major findings? *Summarize major findings in one or two sentences; state your interpretation of the data.*
 - Was the hypothesis supported by the data?
 - How did your findings compare with other researchers or with information in the textbook?
 - What possible explanation can you offer for the findings?
 - What recommendations do you have for further study and for improving the experiment?
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