

FORMAL LAB REPORT FORMAT

The following is a guide for all formal lab reports in this course. You need not limit yourself to this outline. If additional information is warranted then please add it.

Title

- The title should indicate what the lab is all about. Centered at the top of the page.

Introduction & Background

- Include what is already known – with citations
- Indicate what you hope to learn (purpose of the lab)
- List of components of experimental design: Independent variable, dependent variable, control factors, constants.
- Clearly identify your hypothesis
- **Caveat:** This introduction section will take some research. Do not “wing it” by making up information from your head!!

Materials

- List the materials used in the lab

Procedure

- A brief description of the procedure to show how the lab was conducted
- Describe methods for controlling variables
- Describe methods for collecting data
- Note any departure from the instructions given

Results (present the data)

- Construct all data tables and charts to present the data collected
- Must include titles and labels for all tables and charts

Analysis (process the data)

- Construct all graphs needed to show results
 - Correct type (bar, line, pie)
 - Title
 - Appropriate Units
 - Labeled Axis
 - Legend
- Labeled diagrams or photos

Conclusion & Discussion

- State a valid conclusion and explain **WHY** you think the results turned out the way they did.
- Explain any unexpected results and why those results may have been obtained.
- Evaluate the data to determine if it supports your hypothesis using specific reference to the data.

Sources (each under an individual section)

- References – Works cited within your lab report in the introduction or conclusion/discussion.
- Appendix – Put any formulas used for calculating data presented or references in the lab report.

Formal High School Lab Report

**Fred M. Newmann, Dana L.
Carmichael, M. Bruce King**

Formal High School Lab Report:

America's Lab Report National Research Council, Division of Behavioral and Social Sciences and Education, Center for Education, Board on Science Education, Committee on High School Laboratories: Role and Vision, 2006-01-20 Laboratory experiences as a part of most U S high school science curricula have been taken for granted for decades but they have rarely been carefully examined What do they contribute to science learning What can they contribute to science learning What is the current status of labs in our nation s high schools as a context for learning science This book looks at a range of questions about how laboratory experiences fit into U S high schools What is effective laboratory teaching What does research tell us about learning in high school science labs How should student learning in laboratory experiences be assessed Do all student have access to laboratory experiences What changes need to be made to improve laboratory experiences for high school students How can school organization contribute to effective laboratory teaching With increased attention to the U S education system and student outcomes no part of the high school curriculum should escape scrutiny This timely book investigates factors that influence a high school laboratory experience looking closely at what currently takes place and what the goals of those experiences are and should be Science educators school administrators policy makers and parents will all benefit from a better understanding of the need for laboratory experiences to be an integral part of the science curriculum and how that can be accomplished

Science the "write" Way Jodi Wheeler-Toppen, 2011 Writing skills are high on the list of real world requirements for all students OCoincluding science students Every scientific discipline needs professionals who can ably communicate in writing Scientists must be able to describe their proposed studies for funding considerations track their observations and results in their own notes describe their experimental protocols for their peers to replicate and synthesize their work to the wider world community

Teaching High School Science Through Inquiry and Argumentation Douglas Llewellyn, 2013 For Grades 9 12 this new edition covers assessment questioning techniques to promote learning new approaches to traditional labs and activities that emphasize making claims and citing evidence

Authentic Intellectual Work Fred M. Newmann, Dana L. Carmichael, M. Bruce King, 2015-11-14 Equip teachers to provide value beyond school In spite of numerous reforms to improve rigor and relevance in the classroom our schools have been slow to change Backed by over 20 years of research the Authentic Intellectual Work AIW framework helps school based teams improve the quality of instruction assessment and curriculum for higher and more equitable student learning This work provides A research validated field tested framework that can be applied across grades and disciplines A powerful professional learning component that emphasizes teacher collaboration Detailed examples of lessons assignments assessment tasks and student work

Official Proceedings ... Racine (Wis.). Board of Education, 1902

Research Papers For Dummies Geraldine Woods, 2011-03-08 From blank page to final draft this is your straightforward guide to research papers You re sitting at your desk in a classroom or in an airless cubicle wondering how many minutes are left in a seemingly endless day when suddenly

your teacher or supervisor lowers the boom She wants a research paper complete with footnotes and a list of sources She wants accuracy originality and good grammar And gasp she wants ten pages You may be 16 years old or 60 years old but your reaction is the same Help Take heart A research paper may seem daunting but it s a far from impossible project to accomplish Turning research into writing is actually quite easy as long as you follow a few proven techniques And that s where Research Papers For Dummies steps in to help In this easy to understand guide you find out how to search for information using both traditional printed sources and the electronic treasure troves of the Internet You also discover how to take all those bits of information discarding the irrelevant ones and put them into a form that illustrates your point with clarity and originality Here s just a sampling of the topics you ll find in Research Papers For Dummies Types of research papers from business reports to dissertations The basic ingredients of a paper Introduction body conclusion footnotes and bibliography Note taking methods while doing research Avoiding plagiarism and other research paper pitfalls Defining your thesis statement and choosing a structure for your paper Supporting your argument and drawing an insightful conclusion Revising and polishing your prose Top Ten lists on the best ways to begin your research online and in print Research Papers For Dummies also includes an appendix that s full of research paper ideas if you re stuck If you re tasked with writing a research paper chances are you already have a lot of demands on your time You don t need another huge pile of papers to read This book can actually save you time in the long run because it gives you the easiest fastest and most successful methods for completing your paper

Who's the New Kid in Chemistry? John D. Butler,2013-12-12 Who s the New Kid in Chemistry offers an unprecedented look at student engagement and teacher best practices through the eyes of an educational researcher enrolled as a public high school student Over the course of seventy nine consecutive days John D Butler participates in and observes Rhode Island 2013 Teacher of the Year Jessica M Waters s high school chemistry class documenting his experiences as they unfold Who s the New Kid in Chemistry is a compelling example of what can be accomplished when an educational researcher and teacher collaborate in the classroom This work includes a discussion on flexible homework assignments data driven instruction and thirty teacher best practices This book is an invaluable resource for teachers across all content areas masters and doctoral research method classes and future Teachers of the Year

Using Yeast to Teach Genetics and Improve Overall Competency in High School Biology Josef John Hudecek,2000

Exam Alternatives Mason Ross,AI,2025-03-11 Exam Alternatives challenges the over reliance on traditional exams advocating for diverse assessment methods to better gauge student learning It highlights how conventional tests often fail to capture crucial skills like critical thinking and problem solving which are essential in today s world The book explores the limitations of traditional exams delves into alternative assessment strategies such as project based learning and portfolio assessment and provides practical guidance for implementing these methods in various educational settings The book progresses logically beginning with the fundamentals of assessment and then examining the impact of traditional exams on

student motivation and equity Subsequent chapters offer detailed explorations of alternative assessment strategies including performance based tasks peer assessment and self assessment It emphasizes practical implementation offering frameworks and addressing potential challenges This approach moves beyond theory providing educators with concrete tools to transform their assessment practices and improve student outcomes through alternative assessment *Orchestrating Inquiry Learning* Karen Littleton,Eileen Scanlon, Mike Sharples,2012-03-12 There is currently a rapidly growing interest in inquiry learning and an emerging consensus among researchers that particularly when supported by technology it can be a significant vehicle for developing higher order thinking skills Inquiry learning methods also offer learners meaningful and productive approaches to the development of their knowledge of the world yet such methods can present significant challenges for teachers and students *Orchestrating Inquiry Learning* addresses the key challenge of how to resource and support processes of inquiry learning within and beyond the classroom It argues that technological support when coupled with appropriate design of activities and management of the learning environment can enable inquiry learning experiences that are engaging authentic and personally relevant This edited collection of carefully integrated chapters brings together for the first time work on inquiry learning and orchestration of learning Drawing upon a broad range of theoretical perspectives this book examines Orchestration of inquiry learning and instruction Trajectories of inquiry learning Designing for inquiry learning Scripting personal inquiry Collaborative and collective inquiry learning Assessment of inquiry learning Inquiry learning in formal and semi formal educational contexts *Orchestrating Inquiry Learning* is essential reading for all those concerned with understanding and promoting effective inquiry learning The book is aimed at an international audience of researchers post graduate students and advanced undergraduates in education educational technology and psychology It will also be of interest to educational practitioners and policy makers including teachers educational advisors teacher students and their trainers

Eventually, you will certainly discover a additional experience and expertise by spending more cash. still when? attain you acknowledge that you require to get those every needs once having significantly cash? Why dont you try to get something basic in the beginning? Thats something that will lead you to understand even more as regards the globe, experience, some places, in the manner of history, amusement, and a lot more?

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web jun 1 2013 the design of the individual lenslets was performed using zemax this 3d microlens array in this study contains 1219 microlenses that are evenly distributed on its concave surface with a high fill factor the overall field of view of this microlens array on curved substrates is more than 104

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array c and us array dll respectively

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web zemax 1 introduction microlens arrays have been applied in many electro optical and micro optical systems such as flexible light field smart phones¹ solar concentrators² data storage³ and integral imaging 3d displays⁴ etc these microlens arrays are typically composed of microlens cells arranged in a deterministic pattern⁵ the

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web mar 31 2021 zemax llc thanks dr reinhard voelkel of süss microoptics sa for the experimental data used in this article setting up the initial design this article describes a commercial fiber coupler which couples two pieces of corning smf 28e fiber using süss microoptics fc q 250 microlens arrays the manufacturers data is as follows

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web nov 3 2015 with optical sensor arrays tiny lens systems serve to focus and concentrate the light onto the photodiode surface instead of allowing it to fall on non photosensitive areas of the pixel device fill factor area occupied by the microlens arrays mostly the lens shape is cylindrical or spherical array size strongly depends on the applications

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