Science Research Goals

Sophomore Year:

1) Research a topic: Thoroughly research a topic, using literature from primary, secondary and tertiary sources.
    a. Use on-line or printed resources to find general interest articles on the topic of choice
    b. Use sciencedirect or other on-line bibliographic searches to locate articles on the topic
    c. Use textbooks and reference books to become knowledgeable on background information regarding the topic area
    d. Describe contributions that scientists have made in the field
    e. Describe the importance and applications of the research topic
    f. Recognize gaps, discrepancies or problems with the current body of knowledge on the topic
2) Plagiarism Training: Recognize plagiarism and utilize methods to prevent plagiarism
    a. Describe plagiarism and recognize plagiarism examples
    b. Use notetaking and other methods to understand written material
    c. Use paraphrasing and citations to correctly summarize articles
    d. Recognize the difference between APA and MLA formatting (as well as other formats)
    e. Write correctly and consistently formatted Reference lists
3) Reading Journals: Express and present your understanding of the contents and components of a Journal article.
    a. Describe the different parts of a journal article and the type of content that can be found in each part
    b. Provide written summaries of each part of an article
    c. Write summaries of journal articles related to your topic
    d. Create a PowerPoint of a journal article related to your topic
    e. Verbally present a summary of a journal article
4) Mentors: Communicate with professionals and experts in the field
    a. Attend a conference related to your topic
    b. Use resources to obtain contact information regarding experts on the topic
    c. Compose a professionally phrased email to an expert in the field
    d. Have a conversation with a professional, either verbally or via email
    e. Develop a written agreement with your mentor that identifies a commitment to your research
5) Research Writing: Provide written evidence of your research development
    a. Write a rough draft of an abstract of your proposed research
    b. Write an Introduction/Review of Literature discussing the current body of knowledge
    c. Clearly express the problem & hypothesis of your research
    d. Write a tentative research plan (outline) explaining the details of your proposal
    e. Create an appropriate Reference list that corresponds to your Introduction
    f. Create and present a PosterBoard of related research & your tentative research plans

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Junior Year:

1) Research Revisions: Discuss, review and revise your research plans
    a. Provide evidence of communication with mentor (and others) regarding suggestions & revisions to your abstract, review of literature, references, and research plan
    b. Update and revise abstract, Introduction/Review of Literature, and Reference list
    c. Revise and refine your research plan to address procedures, safety and ethical concerns, control and experimental groups, data collection & analysis, and an appropriate time frame and sample size
    d. Create a Presentation of your research plan using PowerPoint
    e. Verbally present your research proposal
2) Research Approval: Obtain approval to begin your research
    a. Review guidelines and procedures for obtaining approval
    b. Complete Fair paperwork, including parental consent forms, as needed
    c. Submit required paperwork to mentor and teacher for suggestions/revisions
    d. Organize and submit paperwork for IRB/SRC approval
    e. Meet with IRB/SRC and obtain proper signatures
3) Research Planning: Gather materials and permits required to begin research
    a. Arrange for funding for any supplies or materials required
    b. Submit a materials list to teacher and/or mentor
    c. Obtain permissions and/or permits to begin study
    d. Gather all materials required
    e. Create a timeline for data collection
4) Conduct Research Project: Begin administering tests and collecting data
    a. Maintain a journal or lab notebook to record observations and data
    b. Prepare photographs or visuals to illustrate key methods, equipment or results
    c. Maintain contact with your mentor and advisors
    d. Familiarize yourself with data analysis methods
    e. Continue to revise your research plans, as needed
5) Research Writing: Provide written & verbal evidence of progression of your research
    a. Update and revise your abstract, Introduction/Review of Literature, and Hypotheses
    b. Write your Methodology (Materials & Methods) section of your paper, using your research plan as a guide
    c. Update and revise your Reference list to appropriately reflect your Introduction and Methodology
    d. Provide evidence of using computer spreadsheet software for data organization
    e. Determine appropriate statistical analysis software that will be used
    f. Create and organize appropriate visuals of your research data and results
    g. Write a rough draft of your Results, and Discussion/Analysis sections of your paper
    h. Submit rough draft of your final paper to your mentor and teacher(s) for revisions
    i. Create and present a visual presentation (PowerPoint and/or PosterBoard) of your research progression, including visuals of data and results as expected

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Senior Year

1) Research Writing: Provide written evidence of completion of your research
    a. Utilize statistical software to analysis your results appropriately
    b. Create and organize appropriate visuals (tables & graphs) and incorporate them into your final paper
    c. Review and follow guidelines for writing a research paper, as required by your teacher and/or Intel
    d. Complete a rough draft for each section required, including an appropriate title, table of contents, introduction, materials and methods, discussion, conclusion, and references
    e. Obtain feedback on each section of your paper from your peers, mentor, and teachers
    f. Revise each section of your paper, as needed
    g. Revise your abstract to include background, procedures, conclusions and relevance
2) Competition Applications: Complete applications for at least 3 scientific competitions
    a. Draft and revise answers to the Intel Science Talent Search Essay questions
    b. Provide evidence of completion on all parts of the application
    c. Obtain evidence that your mentor, guidance counselor, and teacher have all completed their required forms
    d. Complete and submit the Intel Science Talent Search application
    e. Obtain guidelines and application process for two other competitions (JSHS & WESEF)
    f. Revise and submit research paper as required by these competitions
    g. Complete all forms as required, including signatures and paperwork from mentors and teachers
3) Poster Presentation: Create and present an appropriate PosterBoard of your research
    a. Review guidelines for creating an effective poster presentation
    b. Obtain template for creating your PosterBoard in the correct format
    c. Prepare a display that is organized, clear, concise, correctly presented, and visually appealing
    d. Practice speaking freely and confidently about your display
    e. Present your display to classmates and the public
    f. Practice answering questions and engaging in discussions related to your research
4) Oral Presentation: Prepare and present a 12 minute oral presentation of your research
    a. Review the guidelines and suggestions for preparing an oral presentation
    b. Prepare an appropriate PowerPoint presentation that covers all aspects of your research paper
    c. Write a 12 minute script to accompany your PowerPoint presentation
    d. Practice presenting and answering questions regarding your presentation
    e. Obtain feedback from audience regarding improvements to your presentation
    f. Revise your presentation as needed
    g. Save and submit your presentations electronically for future access
5) Looking Back & Giving Back: Reflect on your learning and provide evidence of sharing your knowledge with the public. Write a reflection to address to the following:
    a. What have you learned about scientific research from your participation in this course?

b. How have you demonstrated your scientific attitude, curiosity, inventiveness, initiative, and work habits?
c. What suggestions do you have for students entering this course?
d. How have your interactions with other students in the class affected the progression of your own research?
e. How has participation in this course influenced your career plans?
f. Provide evidence (specific examples) of how you shared your skills and experience with other students in this program
g. Provide evidence of having contributed to sharing your new scientific knowledge with the public through symposiums and/or publications