

Name: _____

Independent Research Project Topic Selection

“Thinking about how the world functions, and how you might improve it, is at the heart of STEM [Science, technology, engineering, and math] research.”

- *Darci Harland*
STEM Student Research Handbook

Selecting a science fair topic can be an exciting and sometimes difficult task. There are lots of things in the world that you may be curious about...something that you have seen in the movies or on the news, something that you have wondered about for a long time, there is no shortage of questions to ask.

Getting started with a long-term research project can be a little overwhelming though so we've prepared the following steps to help you select your science fair project. Remember that you're going to be thinking about this topic for a long time, so do your best to work through these steps so that you pick the project that is right for you.

STEP 1 - The Big List

You will start by making a list of 20-30 different project ideas. Your teacher will provide you with a list of websites that have lots of science fair ideas. You may also explore the internet on your own for ideas. Remember these ideas should be

- (a) testable - comparing an independent and dependent variable,
- (b) feasible - able to be accomplished by an eighth grader in a 6-8 week time period, and
- (c) interesting - something that will keep you excited about your project for a few months.

Success Criteria for Step 1

- I have 20-30 ideas on my list.
- I typed my list in Google Apps and shared it with my teacher.
- At least FIVE of my project ideas are engineering or design questions (many of the websites provided have Engineering sections).
- I used at least four different websites/sources to gather ideas for my list.
- I listed the websites/source I used for each question. (Tip: You may organize your list in a table where the first column lists the source of the idea and the second column lists all of the questions from that source.)

STEP 2 - Topic Selection In Progress Meeting

You will be assigned a small discussion group for this step. Once your big list of project ideas is complete, you will share your list with your group members. Group members will give and receive feedback about the project ideas paying special attention to the three requirements listed in Step 1 above (testable, feasible, interesting).

Success Criteria for Step 2

- All group members shared their big list of project ideas
- All group members listened attentively to one another.
- All group members offered suggestions in a positive way.
- I was open to the suggestions of my group-mates and considered their ideas.

STEP 3 - Narrowing the Field

Based on the comments and suggestions from your group members, eliminate the ideas that you don't think will be testable, feasible, or interesting enough. You may have ideas that you don't want to eliminate completely, but need to be changed in some way. Complete the following table with your top three ideas. (Tip: If you are having trouble with this step, look at the example at the end of this packet.)

NOTES (From your discussions with your group members and your teacher in Steps 4 and 5)			
How am I going to measure it? (General and brief description of Investigation Plan)			
What am I going to measure? (Dependent Variable)			
What am I going to change? (Independent Variable)			
Project Idea (Write in the form of a testable question: How does ___ affect ___?)	<i>Project Idea #1</i>	<i>Project Idea #2</i>	<i>Project Idea #3</i>

Success Criteria for Step 3

- I chose three ideas that I am interested in pursuing.
- I can identify the independent and dependent variables for each of my ideas.
- I have a general plan for how I could accomplish each investigation.

STEP 4 - Teacher Review

Once you have complete the table in Step 3, share it with your teacher for feedback. Keep in mind that your teachers want you to challenge yourself and grow from this experience. They also want you to have rich conversation with your classmates about your research and learn from each other.

Success Criteria for Step 4

- I challenged myself by selecting projects that will stretch my science skills.
- I demonstrated curiosity by selecting topics that are new to me or extend my knowledge.
- I chose ideas that I am confident my parents will be happy about.

STEP 5 - Revision and Final Decisions

Your teacher will provide you with feedback about your top three ideas. Consider the suggestions made and think about how you could revise your topic and/or investigation plan, then answer the following questions in the right hand-hand column. Then, share your answers with your group members and record their comments and feedback in the right-hand column.

<u>Questions to Consider</u> (You write your answers to these questions in this column.)	<u>Comments from Group Members</u> (Summarize the comments/feedback from your group members in this column.)
What question/topic is your first choice for your Independent Research Project (IRP)? Why do you find it interesting? (or) What do you hope to learn?	<i>Can your groupmates think of any other things you could investigate related to this topic/idea?</i>
What changes did you make to your original plan (what you wrote in Step 3) based on your teacher's suggestions?	<i>Share your general investigation plan ideas with your group. Can they offer any suggestions?</i>

<p>What tools/equipment do you need for your investigation? How will you get them?</p>	<p><i>Can your group mates think of anything else you would need?</i></p>
<p>What supplies and/or support will you need from your parents or other adults? Have you talked with them about your plan? Are they willing to help you with what you need?</p>	<p><i>Can your group mates think of anything else that you would need? Can they think of any problems you may encounter?</i></p>
<p>What research do you need to do before you get started? What do you need to know to plan your investigation?</p>	<p><i>What questions or key words would your group mates research if they were you?</i></p>

Success Criteria for Step 5

- I read my teacher's comments and/or met with them about my ideas and listened to their suggestions.
- I demonstrated critical thinking by carefully considering each of the questions above.
- I demonstrated persistence if my first ideas didn't work out.
- I demonstrated adaptability by modifying/changing my ideas as needed.

STEP 6 – Final Approval from Teacher

After you have considered all of the comments and feedback from your group mates, re-write your revised plan in the spaces below.

<p>Project Idea (Write in the form of a testable question: How does _____ affect _____?)</p>	
<p>What am I going to change? (Independent Variable)</p>	
<p>What am I going to measure? (Dependent Variable)</p>	
<p>How am I going to measure it? (General and brief description of Investigation Plan)</p> <p><i>This is the part that will likely have the most revisions. Be sure to think about....</i></p> <p><i>(1) all of the potential problems that your group mates and teacher pointed out,</i></p> <p><i>(2) how you will get all of the things you need, and</i></p> <p><i>(3) if you have the support you will need from your parents/other adults.</i></p>	
<p><i>Teacher's Final Comments and Approval</i></p> <p>APPROVED</p> <p>NEEDS REVISION</p>	

Having trouble finding an idea for your IRP?

Consider this example. The bold text are questions that you can ask yourself. The 'hand writing' text is an example of what a student might answer. You can make a table like this to help you organize your ideas and brainstorm possible questions.

Topic that I am interested in learning more about = <i>Seeds/Plants</i>	
What could I manipulate or change?	<ul style="list-style-type: none"> ● Amount of sunlight ● Quality of sunlight (color, intensity) ● Size of material of container ● Temperature and humidity ● Amount of water
What effects could I look for (things to count and/or describe)?	<ul style="list-style-type: none"> ● Seedling growth ● Speed of germination ● Number of new leaves ● Number of leaves per stem ● Root length ● Speed of root growth ● Color of seed, root, stem, and leaves ● Health of seedlings
Knowledge, tools, and skills I would need to do the project:	<ul style="list-style-type: none"> ● How does a seed germinate? What do seeds need to germinate in a controlled environment? ● What types of seeds would be good to use for a germination study? ● How do I study germination without affecting the root and stem structures? Should I plant the seeds in soil or something else?
Possible IRP Question	<i>How does the intensity of sunlight affect the health of Wisconsin East Plants?</i>