

Science and Technology Fair 2016-2017

All Mac science students are required to prepare a project for the Mac Science and Technology fair scheduled to take place:

Senior (Grades 9, 10 & 11) Project Due: December 7, 2016 Judging (in class): December 7, 8 & 9 2016	Junior (Grades 7 & 8) Project due: December 7, 2016 Judging (in class): December 7, 8 & 9 2016
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This project requires you to **either**:

- 1) **Perform an experiment** in order to prove a hypothesis.
OR
- 2) **Design a technological object** to solve a problem.

Guidelines for experimental projects:

1. Choose a simple & suitable question to investigate 2. Formulate a hypothesis 3. Design an experiment 4. Describe the procedure of your experiment	5. Record data & observations 6. Discuss the results 7. Make a conclusion 8. Present your work neatly & clearly
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Guidelines for technological design projects:

1. Choose a simple & suitable problem to investigate 2. Formulate solutions & choose the best one 3. Design a technological object (include a design plan or technological drawing) 4. Describe the procedure to make your prototype	5. Build your prototype 6. Test & redesign your prototype 7. Make conclusions and recommendations 8. Present your work neatly & clearly
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Important Reminders for All Participants

- Topics and groups must be approved by your teacher**, and you must sign up for your topic by the date required by your teacher.
- Maximum 3 persons** per group from the **same class**. (If you have aspirations to go on to the regional science fair, maximum 2 persons per group).
- Your project can either be presented through a **PowerPoint presentation** OR a **display board**, OR both a **PowerPoint presentation** and a **display board**.
- All projects must involve research and include references (i.e., a bibliography).
- Use the judging form that you have been given as a guideline to prepare your project.
- Hazardous materials are not allowed.
- Try to be unique and original – creativity will be rewarded. Avoid overdone projects like volcanoes, tornadoes, mood & music, sleep deprivation, etc.
- Prizes and awards will be given to the top projects in each grade level.
- This is a major and mandatory part of your Practical evaluation for the term, so make sure that you put in the appropriate time and effort and do a good job!

Sun. Mon. Tue. Wed. Thu. Fri. Sat.

October 2016							1
2	3	4	5	6	7	8	
9	10	11	12	13	14	15	
16	17 Intro to science and technology fair.	18	19	20	21	22	
23	24 Decide topic & groups	25	26	27	28	29	
30	31	Notes:					

Sun. Mon. Tue. Wed. Thu. Fri. Sat.

November 2016

		1	2	3	4	5
6	7 question, hypothesis, variables, materials	8	9	10	11	12
13	14	15	16	17	18	19
20	21 Method, tables, graphs.	22	23	24	25	26
27	28	29	30	Notes:		

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

December 2016

			1	2	3
4	5 lab reports, boards and powerpoints due.	6	7	8	9
11	12	13	14	15	16
18	19	20	21	22	23
25	26	27	28	29	30
					31

4 ← SCIENCE FAIR PRESENTATIONS. → 9

Notes:



Grade Level: _____

Project #: _____

Macdonald High School Science and Technology Fair 2015-2016

Title of Project: _____

Student Name(s): _____

Experimentation

	No Evidence	Below Average	Average	Above Average	Outstanding
	1	2	3	4	5
Scientific (60% of global mark)					
Identified the problem or question	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Objectives of the experiment were clearly stated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developed a hypothesis & identified independent, dependent & control variables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developed a good procedure for testing the hypothesis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thorough data collection. Ran sufficient trials, sample size adequate, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data was organized into appropriate tables and/or graphs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analyzed and interpreted data properly. Explanations were coherent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of terminology was correct	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Errors were recognized & appropriate adjustments were made	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Derived conclusions & related back to hypothesis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recommendations, follow-ups or applications were suggested, experiment was put in context	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The topic or approach was unique or innovative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evidence the student(s) thoroughly researched the topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The project represented the student's own work vs. outside assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
Scientific Score: _____%					

Communication (40% of global mark)	1	2	3	4	5
The presentation was interesting & dynamic (enthusiasm & presence)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The proper terms were used & the subject matter was well understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Responded adequately to questions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All members of the team actively participated in the presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Display board was present, well organized & visually appealing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Display board had all of the necessary components: title, hypothesis, procedure, results (data tables &/or graphs), analysis, conclusion, references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The visual aids properly supported the exhibit & aided comprehension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The written language & terminology used were high quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A written report was present & all the necessary components were included: title page, introduction/hypothesis, procedure, results, analysis, conclusion, minimum 3 references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
Communication Score: _____%					

Final Comments:

Does this project deserve to win a medal? Y or N

Judge's name (please print): _____ GLOBAL SCORE: _____%



Grade Level: _____

Project #: _____

Macdonald High School Science and Technology Fair 2015-2016

Title of Project: _____

Student

Name(s): _____

Technological Design

	No Evidence	Below Average	Average	Above Average	Outstanding
Technology (60% of global mark)	1	2	3	4	5
Identified the problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information was well researched & limitations were identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possible solutions were identified & best one was chosen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Objectives were clearly stated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design plan or technological drawing was well made	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Procedure to make the prototype was well documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appearance of the prototype: finish, ruggedness & craftsmanship are good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The performance of the prototype is well demonstrated; it is functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The student's evaluation criteria were relevant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possible uses or applications were explained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of terminology was correct, explanations were consistent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Errors were recognized & appropriate adjustments were made	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recommendations, improvements, or follow-ups were suggested	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The technological object or approach was unique or innovative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The project represented the student's own work vs. outside assistance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
Technology Score: _____%					

Communication (40% of global mark)	1	2	3	4	5
The presentation was interesting & dynamic (enthusiasm & presence)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The proper terms were used & the subject matter was well understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Responded adequately to questions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All members of the team actively participated in the presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Display board was present, well organized & visually appealing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Display board had all of the necessary components: title, problem, solution, design plan/technical drawing, procedure, results, analysis, conclusion, min. 3 references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The visual aids properly supported the exhibit & aided comprehension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The written language & terminology used were high quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Written report was present & all necessary components were included: title page, problem, solution, design plan/technical drawing, procedure, results, analysis, conclusion, minimum 3 references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
Communication Score: _____%					

Lab Report Format for Macdonald Science Fair

Follow the following lab report format when submitting your final lab report. It must be typed.

Title of the Experiment

1) Purpose: Why are you doing the lab?

Ex. The purpose of the lab is to determine how different types of soil affect the growth rate of plants.

2) Hypothesis: What do you predict will happen in the lab?

Ex. Coarse sand particles will sediment more quickly than fine sand particles because the particles are larger

- Do not use "I think" in your hypothesis, it should be a scientific statement, not a thought
- You must support your hypothesis with scientific reasoning. After your prediction, use the word "because" and explain your prediction.

3) Variables: What are the independent variables, dependant variables, and controls in your experiment?

*Ex. Independent variable: Type of soil plants are grown in
Dependant variable: The rate of plant growth
Controls: amount of water, amount of sunlight*

4) Materials: List all the materials used in the lab.

*Ex. Plants
Soil
Water*

5) Procedure: What steps did you follow while performing your experiment?

- Write a numbered list, not in paragraph form.
- Write in present tense.
- Include all materials used in each step.
- List all precise quantities with units.
- Labeled diagram of set up, (when necessary).

6) Results: Observations made DURING the experiment. What is happening?

- List qualitative observations in point form.
- Include quantitative observations in a **table of results**:
 - Data for all measurements must be in the form of a table.
 - All data measurements must be included in this section.

It is possible that you may only have qualitative or quantitative data. Be sure to present it in the proper way.

7) Analysis: Your interpretation and understanding of the experiment.

a) Calculations (when necessary)

- If you performed any calculations, a sample must be provided in this section.

b) Graph (when necessary)

- It may be a line graph or a bar graph depending on the type of data you collected.
- Graphs can be done on the computer, or by hand. If done by hand, they must be very neat.
- Your graph must have a title including the names of the independent and dependent variables (independent versus dependent variable)
- The x axis (independent variable) and y axis (dependent variable) on your graph must have labels.

c) Analysis Paragraph – ALWAYS do this.

- Summarize your results (data tables and graphs) using scientific language.
- Discuss whether or not you think your results are valid (was it the result you were expecting? If not, explain what you think should have happened).
- Explain your results using scientific language and theory (taught in class or researched online - if you refer to research, provide a reference in the bibliography).

Conclusion, (written as a paragraph): A summary of the experiment.

- Summarize your results in one sentence. This should be written as an answer to the experimental question or task.
- Say if your results agree or disagree with your hypothesis.
- Explain any mistakes you think you made during the experiment.
- Suggest how you could improve the procedure if you were to do the lab again.
- Propose a new experimental question, based on your findings

Technological Design – Lab Report

Your technological design lab report will be structured a little differently than that of experimentation. Follow this format.

Identify the problem:

- What are the functions of the device, software or product?
- What is the device, software or product intended to be used for?
- What needs are to be met by the device, software or product?
- What are the expected obstacles?
- Give a brief history of the product.
- What other products have been created to address the same needs?

Objectives:

- What goals will you achieve with your design?
- Why did you select these goals?

Development:

- Make a list of the equipment you will need to build the product.
- Draw a sketch of your product, (on clean, white paper, in pencil).
- Give the planned dimensions of the product.

Performance:

- How are you testing the product?
- Make observations of the performances - show observations in a graph or table, or both.

Evaluation:

- Does it perform the way that it is intended? To what degree?
- What problems have you encountered?
- Suggestions for improvement.

Science Fair Board

Question	TITLE	Analysis
Hypothesis	Method (continued if necessary)	
Materials	Results: Tables, Graphs, Photos, Info	Conclusion
Method		
Your name(s)		