Summer Project

7th Grade Accelerated Chemistry Students

All accelerated science students entering the 7th grade are required to complete a summer project. Your assignment this summer is to identify and describe the science fair project you will complete for the 2019-2020 Diocesan Science & Engineering Fair.

This assignment is outlined in detail on the attached pages, but first, an important reminder ...

Accelerated Science is a class for highly motivated students who have demonstrated excellent study skills and high aptitude in science, and who have committed to pursuing the study of science at greater depth and complexity than a typical 7th grade science class. As part of this commitment, all accelerated science students are required to:

(1) Identify and complete an **original** science project of a difficulty and depth consistent with being in Accelerated Science.

(2) Research the science happening in their project to the point where the student can accurately and independently explain the relevant scientific ideas.

(3) Attend the Diocesan Science & Engineering Fair and do an excellent job representing SJBMS.

The summer assignment is intended to get you off to a good start in meeting these requirements.

The Science & Engineering Fair Project Proposal form is due on the first day of class.

As soon as students return to school, you will begin researching the science ideas at work in your project. You must use at least three print sources (books, periodicals) of information in your research.

Part of your summer assignment is to identify and **obtain** these books/articles over the summer. Doing so will make your life easier in the fall. Please keep in mind that your research must be *specific* to the scientific ideas at work in your experiment or engineering project.

Identifying a Testable Question

The first step in the science project process is to choose a project. The project must meet the following requirements:

1. The project **must be original**. Ask yourself, "Has this project been done before?" If the answer is yes, stop here and go back to the drawing board.

2. The project must be interesting enough to you that you want to work on it for several months and interesting enough to others that they will want to learn about what you discover.

3. The complexity of the project must be appropriate for *Accelerated* Science. That means that the project should be more challenging and should be significantly more challenging and complex than projects done by 6th grade students. Ask yourself, "Could I have done this project last year?" If the answer is yes, stop here and go back to the drawing board.

4. The project must be designed to answer a **testable** question. Testable questions are not yes/no questions. If choosing an engineering project, the problem must be identified and the proposed solution must be feasible to create.

5. The testable question/project must have one *independent* variable. The variable should be something that is measurable—something that represents a quantity such as a length, width, height, weight, voltage, time, concentration, angle, etc.

6. The experiment should include a single *dependent* variable that is measurable-- something that represents a quantity such as a length, width, height, weight, voltage, time, speed, etc.

7. The experiment should be one in which all other variables (factors that can influence the data or outcome) can be controlled.

8. The experiment should explore an area of science that the student will be able to **research** and **explain**. An experiment that compares brands or consumer products will not be allowed because there is no way to isolate a single independent variable and/or the students cannot explain the results obtained in terms of science (the chemistry of many modern products is at the graduate school level or beyond).

9. You must be able to answer "yes" to every question on the science project question checklist below.

10. You may choose to do an engineering project. An **engineering project** must include: identify a problem, build a solution to the problem (prototype), redesign, and evaluation of solution.

Science Project Question Checklist

Do you find the project interesting enough that you want to work on it for six months?	**Yes/No**
Will the project's results seem relevant and interesting to you and to judges and spectators?	**Yes/No**
Is the question specific enough to suggest a particular experiment (or set of experiments)?	**Yes/No**
Does the experiment have a single independent variable and a single dependent variable?	**Yes/No**
Can you measure changes in your variables using **numbers** that represent quantities, such as length, width, height, weight, voltage, time, etc.	**Yes/No**
Is it possible to control all other factors that might influence the data that is collected in the experiment, so that they do not interfere with the results?	**Yes/No**
Does the project include a control group (if applicable)?	**Yes/No**
Has the student avoided the bad topic areas on the following page?	**Yes/No**
Are there at least three print sources of information on the subject that will allow you to thoroughly research the science going on in your experiment?	**Yes/No**
If your project involves plants, are you willing to have at least ten plants in each category of your experiment to account for the differences in vigor from one plant to the next?	**Yes/No**
If your project is an **engineering project**, is there a clear problem that you will solve? Can you build a prototype to solve the problem? Will you be able to evaluate the effectiveness of your prototype to solve the problem?	**Yes/No**

Prohibited Topics and Other Project Limitations

Prohibited Topics/Limitation	Why?
Any topics that compare brands, or ask "which _____ works best?"	When going from one brand to a next, there is either more than one manipulated variable, or it is impossible to figure out what the manipulated variable is. Also, the science that underlies why one consumer product works better than another is typically at the college level or beyond.
Any project that asks for personal preferences	Such projects are more like surveys than experiments. They don't involve the kind of numerical measurement we want in a science fair.
Any project that involves growing microorganisms or mold at home	Science fair rules
Effect of music on plants	Too difficult to measure
Effect of colored light on plants	Too frequently done –be creative!
Effect of color on taste, emotion, mood, etc.	Too subjective and difficult to measure
Any topic that requires measurements that are extremely difficult to make or repeat	Measurement is needed to provide clear results
Any topic that measures the effect of music, exercise, etc. on blood pressure	Either the result is obvious or difficult to measure with proper controls
ESP or Astrology	No scientific validity
Any project which could be hazardous to the public is prohibited. This includes projects that use: · Poisons, drugs, controlled substances, hazardous substances of devices (i.e. firearms, weapons, ammunition, reloading devices) · Microorganisms which are pathogenic to humans or other live vertebrates · Syringes, needles, any sharp items · Tanks which have contained combustible gases · Highly combustible solids, fluids, or gases	Science fair rules
Any project which uses live animals (other than humans)	Science fair rules

Science Fair Project Proposal

Please answer in complete sentences. If proposing an engineering project, fill out the next page.

Testable Question:

What is your independent variable?

What is your dependent variable?

What are the controlled variables in your experiment?

Is there a control group in your experiment? If so, what is it?

Project Description: What experiments will you do to answer your question?

Student Signature: _____

Parent/Guardian Signature: _____

Engineering Project Proposal

Please answer in complete sentences. If you are not proposing an engineering project, leave this page blank.

Problem Identified:

What is your proposed solution? Explain your prototype.

Is this feasible to construct? Will you have access to necessary materials and supplies?

How will you evaluate the effectiveness of your prototype?

Student Signature: _____

Parent/Guardian Signature: _____

Identifying Background Research Resources for your Project

1. You need to find three print resources that relate to your project over the summer. The information found in these resources will help you to understand the science behind the project that you choose. You will end up finding more once you begin writing your background research paper. However, starting the school year off with at least three sources will help you get started on a project that is scientifically sound.

2. To obtain these resources you can check out books from the library, print articles from science websites or online encyclopedias, or obtain articles from science journals.

3. When you submit your project proposal, you will need to include information about the title, author, publishing company, type of resource, where you obtained the resource, and a brief description of the information included in the resource and how it pertains to your project.

Background Research Resource List

Background Research Resource #1:

Title: _____

Author: _____ Publisher: _____

Type of resource (book, journal, article, etc.): _____

Description of scientific information found in resource and how it relates to your project

proposal:

_____

_____

_____

_____

_____

Background Research Resource #2:

Title: _____

Author: _____ Publisher: _____

Type of resource (book, journal, article, etc.): _____

Description of scientific information found in resource and how it relates to your project proposal:

Background Research Resource #3:

Title: _____

Author: _____ Publisher: _____

Type of resource (book, journal, article, etc.): _____

Description of scientific information found in resource and how it relates to your project proposal:

Grading Rubric: Science Project Proposal

(Please submit with your work on the first day of school)

Name _____

0 = No Evidence 1 = Some Evidence 2 = Clearly Evident	
How original and innovative is the project?	0 1 2
Is there a single independent variable that is measurable using a number that represents a quantity such as a length, width, height, weight, voltage, time, etc.	0 1 2
Is there a single dependent variable that is measurable using a number that represents a quantity such as a length, width, height, weight, voltage, time, etc.	0 1 2
Is it possible to control all other factors that might influence the data that is collected in the experiment, so that they do not interfere with the results?	0 1 2
Has the student included a control group (if applicable)?	0 1 2
Is the question specific enough to suggest an experiment (or set of experiments)?	0 1 2
Has the student avoided the bad topic areas on the list provided?	0 1 2
If the project uses people as subjects, has the student identified a sufficiently large and uniform control group and experimental group?	0 1 2
Does the project meet the requirements listed in the document “Identifying a Testable Question”	0 1 2
Is the project of a depth and complexity that one would expect of a seventh grade honors science student?	0 1 2
Research book/article #1. Is the resource scientifically sound and relevant to your topic?	/5
Research book/article #2. Is the resource scientifically sound and relevant to your topic?	/5
Research book/article #3. Is the resource scientifically sound and relevant to your topic?	/5
Total score:	**____ /35**
Comments:	

Grading Rubric: Engineering Project Proposal

(Please submit with your work on the first day of school)

Name _____

0 = No Evidence 1 = Some Evidence 2 = Clearly Evident	
How original and innovative is the project?	0 1 2
Is a problem clearly identified?	0 1 2
Is a solution to the problem proposed?	0 1 2
Is the solution feasible regarding materials, time, and complexity?	0 1 2
Has the student included a control group (if applicable)?	0 1 2
Has the student described how the prototype/solution will be evaluated?	0 1 2
Has the student avoided the bad topic areas on the list provided?	0 1 2
If the project uses people as subjects, has the student identified a sufficiently large and uniform control group and experimental group?	0 1 2
Does the project meet the requirements listed in the document “Identifying a Testable Question”	0 1 2
Is the project of a depth and complexity that one would expect of a seventh grade honors science student?	0 1 2
Research book/article #1. Is the resource scientifically sound and relevant to your topic?	/5
Research book/article #2. Is the resource scientifically sound and relevant to your topic?	/5
Research book/article #3. Is the resource scientifically sound and relevant to your topic?	/5
Total score:	**____ /35**
Comments:	