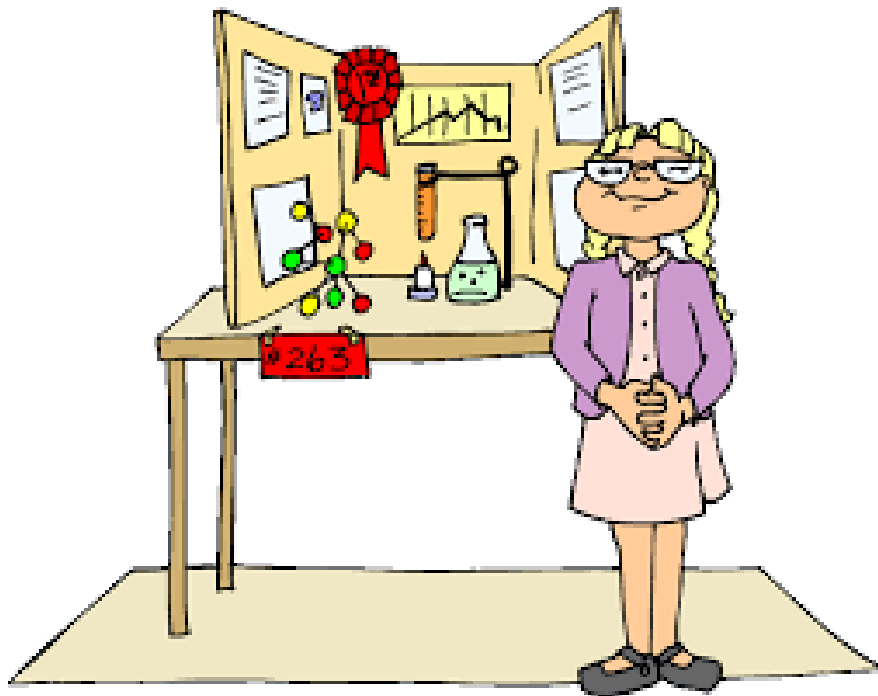


Science Fair Guide



**Archbishop Walsh Academy
Southern Tier Catholic School**

Dear Families,

All students in grades 5-12 are required to complete a Science Fair project. This should be a fun learning opportunity for students. Here are some tips on how to help your children have a positive Science Fair experience.

- Parental assistance and encouragement significantly impacts your children. This is an opportunity for the students to create and discover on their own.
 - Though individual teachers may allow time for in class work on this project, most of the work will be done outside of school hours. Students who need to use school facilities and equipment must make arrangements with their teachers.
- Projects must be approved by teachers.
- Please encourage your child to start working on their project as soon as it is assigned. They will need time to explore, adjust and possibly start over again.
- Encourage students to be risk takers, to be creative in their approach to choosing a topic and solving a scientific problem.
- Failure is a part of the scientific process. Please encourage your students to persevere, learn from their mistakes and to make adjustments.
- Remember that negative or unexpected results are not necessarily mistakes or failures, they are answers to the research question.
- The primary objective of our Science Fair is to facilitate a hands on, independent learning experience for our students. Students are graded by their individual teacher based on grade level and curriculum requirements.
- The judging and awarding of prizes allows students to compete for the privilege of moving on to regional science fairs. It is essential that parents model good sportsmanship for their children and all of our students. If a student does not win, please remind them that placings in a competition are the result of one panel of judges on one day. Disparaging of other students' projects is unsportsmanlike and unacceptable. The judges' decisions are final.

The Scientific Process

1. **Create a science journal in which to keep your notes.**

This may be the traditional bound composition notebook or digital notes that will be printed and placed in a binder to be displayed on the science fair table. Record your initial thoughts on choosing a project, background research, data and observations.

2. **Choose a topic which interests you.**

Be original! Ask a question about something that peaks your curiosity! Take safety into consideration. All projects must be approved by your teacher. Use of human subjects requires a consent form signed by the subject or guardian. Use of live animals is strictly regulated and require teacher approval. Projects which use potentially dangerous materials require a proposal signed by a parent. The proposal will be reviewed by the teacher and administration for approval.

3. **Ask a focused research question.**

4. **Research your question.**

Use books, journals or credible websites. Be sure to keep track of your citations in your journal including URLs for web based articles, authors, book or journal titles, publishers, publication dates, city of publication for books. This information will be used later to create your bibliography using a citation generator. *URLs ALONE ARE NOT CITATIONS!*

5. **Form a hypothesis.** The hypothesis should be a prediction in statement form based on the information you gathered in your research. The hypothesis must be testable.

For example:

“If plants are grown under ultraviolet light for twenty four hours a day, they will grow faster than plants grown in ultraviolet for shorter amounts of time because increased amounts of light increases the rate of photosynthesis.”

6. Plan your experiment.

Materials List all materials you will use.

Methods In paragraph form, write all of the steps you will take to carry out your experiment.

7. Define your variables.

Independent Variable - The variable that you change for experimental purposes.

Example: Amount of time plants were under UV light.

Dependent Variable – The variable that will be measured.

Example: Height of plants.

Controlled Variables – The variables which will be kept the same.

Example: Amount of water, temperature, amount of sunlight.

8. Carry out your experiment and collect data.

- Create a table on which to collect quantitative (numerical) data.
 - Independent variable will go in the left column.
 - Dependent variable will go across the top.
 - Average of data will go on right column.
 - Individual Tables must not be split across pages.

Amount of Sunlight and Plant Growth

| | Height of plants | | | |
|---------------------------------|------------------|-----------|-----------|--------------------|
| Amount of Sunlight Time in hrs. | Day 1 cm. | Day 2 cm. | Day 3 cm. | Average Growth cm. |
| | | | | |
| | | | | |
| | | | | |

Observations

- Create a table for qualitative data (observations)
 - Individual tables must not be split between pages.

| Amount of Sunlight Time in hrs. | Day 1 | Day 2 | Day 3 |
|---------------------------------|-------|-------|-------|
| | | | |
| | | | |
| | | | |

9. Analysis of Data

Use a spreadsheet program to create graphs.

Use statistical analysis to analyze data.

Averages, Chi Square tests, t-Tests and R values are all tools to help you analyze your data. Your teachers will help you to determine the best method of analysis.

10. Conclusions

Now that you have collected data, you should be able to draw conclusions from your investigation. Go back to your hypothesis.

Was your hypothesis supported or not supported? Did your mathematic analysis show statistical significance? Are there clues in your background research that might help you to explain what happened? Did you need to start over? What challenges did you face? If you were to do this investigation again, what would you change? Were there problems with the procedure that you would like to fix? Were there variables that were not completely controlled for? Did your data raise new questions that you would like to investigate?

Your Report

Now that you have completed your investigation it is time to type your report.

- 1. Reports must be typed in MLA format.**
- 2. Please use Times New Roman 12 point font.** Double Spacing is preferred.
- 3. These are the required components for your paper in order:**
 - Title Page
 - Table of Contents
 - Research Question
 - Background Research
 - Hypothesis
 - Identification of Variables
 - Independent Variable
 - Dependent Variable
 - Controlled Variables
 - Materials
 - Methods
 - Data Tables
 - Quantitative Table (Numerical Values)
 - Qualitative Table (Observations)
 - Analysis of Data
 - Statistical Calculations (Your teacher will help you)
 - Graphs
 - Conclusion with Evaluation
 - Bibliography (Citations in MLA Format)

4. Write an abstract

- An abstract is a summary of your report. It should be typed and no longer than a paragraph or two.
- Make 3 copies to hand to your judges. You may put multiple copies on the page and cut them apart. Abstracts will be set on your table.

Abstract includes:

Research Question

Hypothesis

Brief description of your procedure

Brief description of your results

A summary of your conclusion

5. Create your board

You will need a tri-fold board. These can be purchased at Walmart, Dollar Tree, Dollar General, Staples.

You will use components from your written paper to create your board.

Font on the board should be large enough to read comfortably from three feet away.

Poster Board or construction paper can be used as a backing for pictures and printed text, graphs, tables etc. to make the board more attractive.

Include:

Title

Research Question

Background Research

Hypothesis

Variables

Materials

Methods (Procedures)

Data Tables

Graphs

Photographs/Diagrams

Conclusion

Bibliography

Example of Table Set-Up

Adjustments may be made to the layout if necessary. Text should be large enough to be read comfortably from three feet away. Board should be attractive and neatly constructed.

| | | |
|--|---|---|
| Research Question <input type="text"/> | TITLE | Tables <input type="text"/> |
| Background <input type="text"/> | Materials <input type="text"/> | Graphs <input type="text"/> |
| Hypothesis <input type="text"/> | Procedures <input type="text"/> | Conclusion <input type="text"/> |
| Variables <input type="text"/> | Diagrams <input type="text"/> <input type="text"/> | Bibliography <input type="text"/> |
| | Photos <input type="text"/> <input type="text"/> <input type="text"/> | |

Journal

Abstracts

Additional Materials

Samples
Equipment
Laptop
Models

Research Paper

Archbishop Walsh/Southern Tier Catholic School Science Fair Judging Rubric

Student Name _____

Grade _____

Project Title _____

Judge's Initials _____

| Criteria | | | | | | Comments |
|---|---------------------|---------------------|-----------------|-------------|------------------|--------------------|
| Display Elements | Absent | Present | | | | |
| Trifold Board | 0 | 2 | | | | |
| Report | 0 | 2 | | | | |
| Journal | 0 | 2 | | | | |
| Abstract | 0 | 2 | | | | |
| Additional Materials (videos, equipment, models) | 0 | 2 | | | | |
| Board Elements | Absent | Present | | | | |
| Title | 0 | 2 | | | | |
| Research Question | 0 | 2 | | | | |
| Hypothesis | 0 | 2 | | | | |
| Back Ground Research | 0 | 2 | | | | |
| Variables | 0 | 2 | | | | |
| Materials | 0 | 2 | | | | |
| Procedures (Methods) | 0 | 2 | | | | |
| Graphs | 0 | 2 | | | | |
| Conclusion | 0 | 2 | | | | |
| Bibliography | 0 | 2 | | | | |
| Investigation | Not Observed | Not Adequate | Adequate | Good | Excellent | |
| Research Question is clearly stated and focused. | 0 | 2 | 3 | 4 | 5 | |
| Variables are clearly and correctly defined. | 0 | 2 | 3 | 4 | 5 | |
| There is sufficient effort to control environmental variables. | 0 | 2 | 3 | 4 | 5 | |
| Sufficient sample size used. | 0 | 2 | 3 | 4 | 5 | |
| Creative approach to solving the problem is evident. | 0 | 2 | 3 | 4 | 5 | |
| Correct Grammar and Spelling evident. | 0 | 2 | 3 | 4 | 5 | |
| Qualitative Data (Observations are presented and expressed appropriately.) | 0 | 2 | 3 | 4 | 5 | |
| .Quantitative Data (Numerical Data is presented and expressed appropriately.) | 0 | 2 | 3 | 4 | 5 | |
| Mathematical analysis of data is carried out appropriately. | 0 | 2 | 3 | 4 | 5 | |
| Conclusions are justified by data. | 0 | 2 | 3 | 4 | 5 | |
| Board is neat and attractive. | 0 | 2 | 3 | 4 | 5 | |
| Student is able to clearly and concisely explain the project. | 0 | 2 | 3 | 4 | 5 | |
| Student is able to answer age appropriate questions. | 0 | 2 | 3 | 4 | 5 | |
| Evaluate the overall quality of the project. | 0 | 2 | 3 | 4 | 5 | |
| Column Totals | | | | | | Total Score |

Important Information

All students in grades 5-12 must complete a Science Fair project.

On the day of the Science Fair, judging will take place during the school day.

- Judging will begin at 8:15 AM.
- Judging is not open to the public.

All Materials must be set up in the gym by 8:00 AM on the day of the fair.

- **BOARDS MUST BE FINISHED AND HANDED IN ON TIME!**
 - Boards will not be accepted after judging has begun.
 - Students will not be permitted to assemble boards and displays after judging has begun.
 - Students must present to a judge upon request. Refusal to do so will result in disqualification.

An awards ceremony will be held at 6:00 PM in the gym on the evening of the Science Fair.

- The ceremony is open to the public.
- Student attendance is mandatory.
- Doors will open at 6:00, students should stand by their boards to answer any questions from the public.
- Awards will be announced promptly at 6:30.
- Students are required to wear their uniforms.

These items are required for the Science Fair:

- Tri-Fold Board
- Science Journal
- Typed Report
- Three (3) copies of the abstract to be handed to judges

Additional Materials may be placed on the table to enhance your display.

- Models
- Videos
- Equipment
- Samples

Acknowledgement of Science Fair Policies and Procedures

I have read and understood the policies and procedures outlined in the Student Science Fair Guide.

- I understand the requirements for the Archbishop Walsh Science Fair experiment, report and board.
- I understand that the majority of this project will be done outside of regular school hours.
- I agree to make arrangements with my teacher if I need to use school equipment or facilities.
- I agree to meet all deadlines for assignments pertaining to the science fair and that failure to do so may result in a reduction in my grade.
- I agree that my project and all materials will be turned in on time and that failure to do so may result in a reduction in my grade and disqualification from the Science Fair.
- I understand that grading for this project is performed by the student's classroom teacher.
- I understand that judging is performed by a panel of judges from the community for the purpose of qualifying for regional science fairs and that judging does **not** impact the classroom grade.
- I understand that the judges' decision is final.
- I understand that all projects must be approved by the teacher in order to assess safety considerations.
- I understand that all human subjects must sign a consent form before participating in my investigation.
- I have read and understand the judging rubric.
- I agree to abide by all procedures, policies, requirements and rules outlined in the Science Fair Guide.

Student Signature _____ **Date** _____

Parent Signature _____ **Date** _____