![Hamilton-Wentworth Catholic District School Board logo]

Hamilton-Wentworth Catholic District School Board

Believing, Achieving, Serving

SYSTEM SCIENCE AND ENGINEERING FAIR 2018-2019

Student Information and Registration Package

LOCATION	**Bishop Ryan Catholic Secondary School** 1824 Rymal Road East, Hamilton, ON, L0R 1P0 (905) 573-2151
Friday, March 1, 2019 **4:00 pm - 7:00 pm**	Registration / Set-up of Exhibits
Saturday, March 2, 2019 **9:00 am - 3:00 pm**	Student Activities, Judging and Awards Ceremony

WEBSITE:

http://www.hwcdsb.ca

System Science and Engineering Fair 2018-2019

Dear Parent(s)/Guardian(s):

Your child has been invited to take part in the 2019 Hamilton-Wentworth Catholic District School Board (HWCDSB) System Science and Engineering Fair, an exciting event that encourages students to think like young scientists.   During the next few weeks your child will be designing a science project that uses the scientific method to solve a problem.   We hope you agree that the educational benefits are numerous, as students develop skills in writing, oral presentation, creative thinking, and problem solving.

We ask that you encourage your child and monitor his or her progress along the way.   Your support is key to a successful project, but please do not allow your involvement to extend any further in order to assure equity and promote student learning!   It is important that your child wrestle with problems and try to solve them.   Guide your child whenever and where ever you can, but let the final project reflect your child's individual effort and design.

Participants shall enter only once either as an individual or in a team (consisting of a maximum of 2 students per exhibit).   Please check our resource links for more information on creating a successful Science Fair Project.   If you have any questions, do not hesitate to contact your child's classroom teacher or the School Science Fair Contact Person.   We look forward to watching your child enjoy this unique opportunity for scientific discovery!

Sincerely,
The HWCDSB System Science and Engineering Fair Committee

"WHAT IS THE SCHEDULE FOR THE SYSTEM SCIENCE AND ENGINEERING FAIR?"

SETUP of EXHIBITS: Friday, March 1, 2019 from 4:00 p.m. - 7:00 p.m.
This is the period of time when student exhibitors are expected to register and set-up their display.
Please check for the signs on the doors leading into the school from parking lot that will direct you to the Registration Desk located in the Cafeteria.   All students must report to the desk to **register for the fair,** hand in their **registration form**, and be given details as to **where in the gymnasium the project will be set-up**.

All projects **MUST BE SAFETY CHECKED BY A DESIGNATED MEMBER OF THE EXHIBIT SAFETY COMMITTEE** before the student(s) leave the gymnasium that evening.   Once your exhibit has been set-up to your satisfaction, please locate one of the Safety Check Committee Members who will be in the gym - **they will be wearing a Safety Committee shirt** - and invite them to check your exhibit.   Once your project has been successfully safety checked you can leave the gymnasium.

SATURDAY MARCH 2, 2019 - EXHIBIT JUDGING DAY:

9:00 a.m. - 10:30 a.m.	Orientation Meeting for Students in auditorium
10:30 a.m. - 12:00 noon	Exhibit Judging with Students in Gym
12:00 noon - 12:20 p.m.	This is the lunch period. Students are expected to remain in gym to eat their lunch. Just a reminder to bring a peanut free lunch.
12:20 p.m. - 12:45 p.m.	Students will be given the opportunity to view the other exhibitor's projects.
12:45 p.m. - 1:45 p.m.	The exhibits will be open to the public for viewing. Student exhibitors are expected to remain at their projects.
2:00 p.m.	The Awards Ceremony will take place in the School Auditorium. Please follow the signs. Gymnasiums will be locked at 2:00 pm until after the Awards Ceremony.
After the Awards Ceremony	All exhibits must be dismantled and removed from the gymnasium.

A FIELD GUIDE FOR COMPLETING A SCIENCE FAIR PROJECT

This field guide has been created to help students navigate through the process of completing a science fair project.   It is important to note that this is a general guide, and students must apply these tips and suggestions to their own unique science fair topic.

All projects are evaluated according to the following breakdown:

Part A:	Abstract	Maximum of 5 marks
Part B:	Display	Maximum of 10 marks
Part C:	Notebook/Work Journal	Maximum of 15 marks
Part D:	Interview	Maximum of 20 marks
Part E:	Scientific Thought	Maximum of 50 marks
		TOTAL 100 marks

STEP #1 - CHOOSE THE TYPE OF PROJECT THAT YOU WOULD LIKE TO DO
Students have the option to pick one of three different types of science fair projects.   All three types of projects are graded equally, and there is no "better" type of project.   The most important part of a science fair project is picking a topic that interests YOU! You will be doing a lot of research on the topic that you choose, so make sure that you pick something that you understand and enjoy!

These are the three types of projects students can create for the Science Fair:

1) Experiment: A scientific procedure that is created to demonstrate a known fact, test a hypothesis, or make a discovery.   For example, the student would perform and experiment themselves and record their findings according to the scientific method.

2) Study: A collection and analysis of data pertaining to a specific topic to reveal evidence of a correlation or pattern of scientific interest.   Can also suggest novel solutions or points about the problem selected.   For example, the student would review scientific articles about a topic and make an argument for or against the conclusions drawn from the articles.

3) Innovation: The development and evaluation of an innovative device, model, or technique using approaches from the fields of technology and/or engineering.   For example, the student would create a novel innovation or modification to a pre-existing technology to enhance the performance of that technology while completing a given task.

STEP #2 – CONDUCT THE RESEARCH AND COMPLETE THE PROJECT
(1) Introduction – Background Research
Once you have picked your science fair project topic, you need to do some background research to learn more about your topic.   You want to look for 'main-stream' sources from basic Google searches to learn the basics about your topic, and then start to look at more 'scientific' sources such as scientific journal articles and articles from well-known science magazines. **The more articles the better!** You want to make sure you know a lot about your topic so that way you can design a good Experiment/Study/Innovation to explore it further.

The key to doing background research is to first learn about your topic.   Once you have learned the basics from the 'main-stream' articles, write a list of questions that you want to learn more about and potentially test.   These will come in handy when you are searching for more 'scientific' articles because you can narrow your search for the things you are really interested in.

By the end of your background research, you want to have picked a problem within your topic that you want to try and solve. You should do some research to see how other scientists have attempted to solve this problem. You should then decide how you are going to test/explore the problem based on the research you have read. A good thing to do is to 'brainstorm' different ideas. On your backboard or digital presentation, you should briefly summarize your research to highlight the main points for the judges.

NOTE: Make sure you hold onto the list of the websites, articles, and journals that you have read during this stage, as you must include them later in your Bibliography/Works Cited page!

(2) Hypothesis
Once you have picked a problem in your topic that you are going to test, you have to make a hypothesis. A hypothesis is when you make a prediction of what you think the results of your Experiment/Study/Innovation are going to be even though you have not done the experiment yet. It is ok that you have not done the Experiment/Study/Innovation yet! The hypothesis that you make can be wrong after you complete your project, and that is OK as well! As long as you identify *where* you went wrong or why your hypothesis was incorrect, you can still succeed. The point of the hypothesis is to use your background research to make an 'educated guess' of how your approach to the problem is going to turn out.

NOTE: You want to make sure you do enough background research before you write your hypothesis.

(3) Materials/Methods
In this section, if you are doing an Experiment or Innovation, you should list all of the things that you are going to use to complete your project. Then you should include a paragraph to explain how you are going to use them and list the steps involved for your project. If you are doing a Study, you should explain the types of sources that you are going to use to explore your topic and how you are going to use them.

NOTE: For Experiments/Innovations, you should have what is known as a 'control group' so that you have data that has been unaffected by your project that you can compare your test results to during your analysis. For Studies, you should try and address 'both sides' of the problem to make your argument stronger.

(4) Results
Now it is time to do your project! Make sure if you do an Experiment or Innovation to take plenty of pictures and measurements so that you can graph your results. Make sure you refer back to your control. If you do a study, make sure you look up many good scientific articles so that you have plenty of data to compare. If you do a Study, you can include some of the graphs and interesting pictures from each of the articles you read. This may help you to compare the results from different studies to prove your argument.
The Results section is where you write down the numbers and the results of your project for an Experiment/Innovation, or where you outline the main arguments for and against your position if you are doing a Study.

NOTE: On the day of the Science Fair, if students have created an Invention, they are *highly encouraged* to bring their invention to the fair to show the judges as part of a physical display. Please note that if electrical outlets are needed, students will have to make this request when registering for the fair. Students that have done an Experiment are *highly encouraged* to bring some of the materials that they used in their experiment to highlight their process to the judge. Students that have completed a Study are *highly encouraged* to bring along any visuals that will aid in the explanation of their study to the judge.

(5) Discussion
This is the section where you talk about what your results *mean* for your project. This is where you outline how the results you obtained either support or go against your hypothesis that you wrote at the beginning of the project, and how your project fits with the background research you did earlier.

(6) Conclusion
This is where you talk about how your Experiment/Study/Innovation answers the question that you wrote down at the beginning of the project. Talk about things that you would have changed if you had to do the project again, or areas that you could expand upon your project in the future. You can also talk about future lines of research in the larger scientific community and describe how your project makes a difference in the world of scientific research.

(7) Bibliography/Works Cited
Academic dishonesty is a large problem in the world of science today, and students must submit a project that contains their own original thoughts and ideas. Students are free to include some citations from the articles and journals they have read while conducting their research, but students must **NOT** copy and paste sections from academic sources and claim that it is their own work. Just as you would not want someone taking your science fair project and claiming that it was their own work, you must not take sections from another scientist's work and claim it as your own work.

Thus, it is important for all students to make sure that they are including a proper citation for any source they use. All of the citations can be included in a Bibliography/Works Cited section at the end of their project. The Bibliography/Works Cited section allows students to show the judges all of the sources that they used to complete their project. All reference lists should be done according to a proper citation format. Some acceptable formats are APA, MLA, and CMS. A good source to use when making your reference list is "Purdue Owl", and there are also automatic citation generators that can be easily used by students such as "Cite This For Me*".
- Purdue Owl: https://owl.english.purdue.edu/owl/
- Cite This For Me: http://www.citethisforme.com/

(8) Acknowledgements
Make sure you include a short section to thank everyone who helped you with your project!

(9) Abstract
The Abstract is a very important piece of the science fair project because it gives the judge a quick look through everything you have done in your project. The Abstract is the summary of your project and tells the judge everything they need to know in one paragraph. You want to make sure that you include the following in your Abstract:
1. Your main hypothesis;
2. A brief summary of how you completed your project;
3. A brief summary of your project's results;
4. A brief summary of your project's discussion; and,
5. A brief summary of your project's conclusion.

The key to a good Abstract is to **KEEP IT BRIEF**, you just want to give the judge a quick overview of everything you have done. They can read your backboard/presentation for further details. Abstracts are usually around 200 words long or one paragraph, so do not write much more than that.
NOTE: The Abstract is the LAST thing that you write for your project because you need to know what your results and your conclusions are going to be! However, it actually goes at the BEGINNING of the project. *Use the following sheet as the first page in your project binder.

PART A

Note: You must place a copy of your abstract in the front of your project binder. Your abstract must be printed in ink or typed.

Project Title:

Please discuss, in 200 words or less:
- your main hypothesis;
- a brief summary of how you completed your project;
- a brief summary of your project's results;
- a brief summary of your project's discussion; and,
- a brief summary of your project's conclusion.

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Exhibitor 1: _____   **School:** _____

Exhibitor 2: _____

PART B

<u>STEP #2 – PREPARE THE DISPLAY</u>
Display Options:
All students from Grades 6 to 12 must complete a backboard display for their project.   Only students in Grades 4 and 5 have the option of completing either a backboard project or a digital presentation as part of the HWCDSB's continuing goal of integrating technology into the Science Fair.   For students in Grades 4 and 5 who have chosen to do a digital presentation, you **MUST** <u>download your presentation onto a personal laptop or tablet **BEFORE** attending the event</u>.   <u>Wi-Fi will NOT be available for student access.</u>   This is due to the limited Wi-Fi access at the venue. Students will use their own personal laptop or tablet to complete their presentation, so all devices should be fully charged before attending the fair.   Recommended platforms for the digital presentation are Microsoft *PowerPoint* or Apple *Keynote*.   Web-based platforms, such as Microsoft *Sway*, rely on constant Wi-Fi access, so they cannot be used for this event.

On the backboard or digital presentation, you should only include a brief summary of your findings and the most important graphs and pictures.   This will make it easy for the judges to read your backboard or digital presentation.   The project notebook is where you put *everything* that you did in your project, including things that did not "make the cut" onto your backboard or digital presentation.

All exhibits, including all accessories, must be confined to a table not to exceed 0.8 metres, front to back; 1.2 metres side to side; and 2.5 metres maximum height from the floor.

PART C

<u>PROJECT NOTEBOOK/WORK JOURNAL</u>
The project notebook is a very important part of the Science Fair Project because it is where you include everything that you did for your project.   On your backboard or digital presentation, it is impossible to fit in every piece of data you collected, every picture, and every graph.   So, the project notebook allows you to include all of that information in a way that the judge can flip through before they interview you about your project.

Make sure that your project notebook is organized and easy for the judges to read, and do not forget it on the day of the Science Fair!

PART D

<u>INTERVIEW</u>
Students must be able to demonstrate an understanding of the project they have prepared. Students should be able to summarize their work and answer questions related to the project.

PART E

This mark is based on the overall scientific thought and creativity of your project.

FINAL CHECKLIST

Before going to the Science Fair, complete this checklist to make sure that you have everything that you need in your project to be successful at the Science Fair:

- Abstract
- Background Information
- Hypothesis
- Materials/Methods
- Results
- Discussion
- Conclusion
- Bibliography/Works Cited
- Acknowledgements
- Project Notebook
- Backboard or computer devices for your display
- Power cords, adaptors, extension cords as required

BEHAVIOURAL EXPECTATIONS

It is expected that all exhibitors will conduct themselves in a manner that reflects favourably on their home schools and the Hamilton-Wentworth Catholic District School Board.

Students are expected to remain on site and eat their lunch in the gym.   Students are reminded to bring a nut free lunch.   No food will be available at the Fair.

The following rules will be strictly enforced:
a) Food and drinks should be consumed during the lunch time only.
b) Areas around projects are to be kept neat and clean. Please place all garbage in proper receptacles.
c) Students are required to wear their school uniforms.

ANY EXHIBITOR WHO FAILS TO ADHERE TO THE RULES AND DEMONSTRATES UNACCEPTABLE BEHAVIOUR WILL BE DISQUALIFIED AND THE PARENT/GUARDIAN CONTACTED ABOUT REMOVING THE STUDENT FROM THE FAIR PREMISES.

The System Science Fair Committee accepts NO responsibility for any lost, damaged or misplaced items. It is required that exhibitors remain with their exhibits, particularly during public visitation times.

SYSTEM SCIENCE AND ENGINEERING FAIR RULES

1. Only students in Grades 4 to 12 in any school in the Hamilton-Wentworth Catholic District School Board may enter as part of the allocated school exhibits.

2. Exhibits shall be on a scientific topic.

3. Participants shall enter only once either as an individual or in a team (consisting of a maximum of 2 students per exhibit).

4. Size - Each exhibitor will be asked to use the standard sized cardboard backdrop:
   - 122cm high, 48 cm deep, 94 cm *across (48" high, 19" deep, 37" across*)
   - Maximum overall height (including table) 244cm *(96")*.
   - Maximum depth of total project 75 cm *(29")*.

5. Exhibits must be designed and assembled entirely by students although they may seek advice from educators and others. Bought or borrowed equipment may be used, but judgement of exhibits will be based on the scientific and technical work done by students and not on the cost of accessory or incidental equipment. Each exhibit should be arranged so that it can be understood without a demonstration.

6. Exhibits shown at Science Fairs in the previous years may not be shown again without specific modifications. (This does not pertain to the "lead-up" Science Fair, to this culminating Science Fair).

7. Applicants must write a 200-word/one paragraph Abstract of their exhibit and include it with their notebook at the exhibit.

8. All exhibitors must be present at their exhibit according to the schedule issued by the Science Fair Committee prior to the Fair.

9. The Official Registration Form must be submitted to the Science Fair Registration Desk at Bishop Ryan Catholic Secondary School on Friday March 1, 2019.   Immediately after the student(s) set-up their exhibit, a member of the Health and Safety Committee will complete the Health and Safety Form with the exhibitor(s).
   All exhibitors must dismantle and remove their exhibits following the Awards Ceremony.

10. Electronic components, such as switches and wiring are to be of an approved variety and for 110-volt operation using 3 pronged receptacles. Any necessary extension cords must be C.S.A. approved and provided by the exhibitor(s).   No water or gas sources are available.

11. Vertebrate animals may NOT be displayed at the Science Fair as per regulations.

12. Dangerous chemicals and open flames are forbidden.

13. Due to the possibility of allergic reactions, display boards may not contain food.

14. Failure to adhere to these rules will disqualify the exhibit.

15. All participating exhibits must be registered on Friday March 1, 2019.

16. All participating exhibits must be judged on Saturday March 2, 2019.

    (For a complete list of rules, please see the website @ http://www.hwcdsb.ca)

The purpose of the Hamilton-Wentworth Catholic District System School Board Science and Engineering Fair Awards is to provide students with acknowledgement for demonstrating good scientific methods in the pursuit of their experimentation.   Our hope is that these awards will in some way heighten awareness in this area, and increase emphasis on the experimental process, rather than on results and presentation.

EXHIBIT LEVELS	
Junior	Grades 4, 5, 6
Intermediate	Grades 7, 8
Senior	Grades 9, 10, 11, 12

INDIVIDUAL MEDALLIONS		SCHOOL AWARDS	
All individual student awards are presented on the basis of individual average scores achieved as determined by a panel of three judges.		All school awards are awarded to the schools on the basis of overall average of all possible entered projects.	
Average Score	Award	Final Score	Award
85 - 100%	Gold Medallion	85 - 100%	Gold
75 - 84.99%	Silver Medallion	75 - 84.99%	Silver
65 - 74.99 %	Bronze Medallion	65 - 74.99 %	Bronze

SPECIAL AWARDS
Environmental Award - Best overall exhibit related to an environmental issue/topic for each exhibit level *(Junior, Intermediate and Senior)*. **BASEF Award** - Best overall project from Grade 7 & 8