Acknowledgment of Receipt of Science Fair Information

I/We the parent(s) or legal guardians of _____(student's name) opened online and reviewed 15 pages of information relating to the 2019-2020 St. Anthony Science Fair. (If you do not have internet access, please request a printed package in writing.) I/We have reviewed the calendar and due dates associated with the science fair project.

_____ Date _____ _____ Date _____

Parent Responsibilities:

1. Put important dates on the family calendar. Help keep track of due dates.
2. Provide support, advice and helping hands, but ensure the project is the student's work.
3. Provide opportunities to research at the public library.
4. Provide a safe place to keep the science fair experiment materials away from brothers, sisters and project-eating pets!
5. Review and sign the following forms included in this packet: Acknowledgement, Proposal, and Experiment Sheet.

Signature _____ _____

Student Responsibilities:

1. Put your best effort into the science fair project.
2. Ask for help when you need it, but do the work yourself.
3. Keep track of due dates. Turn in assignments on or before the due date.
4. Record <u>everything</u> you do for the science fair in your logbook. Date your entries. Bring your logbook to class for scheduled logbook checks.
5. Learn, have fun and be proud of what you can do.

Signature _____

Please return to Mrs. Miller no later than October 4th, Friday. This form is worth 2 points.

Choosing a Topic:

Students may browse the Internet, science books, and magazines. Some books are available in the classroom. Books may not leave the classroom but students may copy experiments from them. Students may discuss topics with parents, family friends and acquaintances with experience in areas that interest the student. Any non-parent mentors should be listed on the proposal form.

Projects must be experiments. Students will not receive approval for building models, equipment, setting up demonstrations, or comparing products. The experiment should answer a question. It should test a cause and effect relationship. The experimental question should have a form similar to "What is the affect of increasing (or decreasing) the amount of *(your independent variable)* on *(your dependent variable)*?"

Students will need to identify all variables (factors that might affect or change the results). The experiment will test the effect of one variable (**independent variable**) on the factor you are measuring for your results (**dependent variable**). All other variables (**constants**) must not change during the experiment. All experiments must have a control or standard for comparison. The **control** will be a zero quantity of your independent variable. Successful experiments have results that can be measured and expressed as numbers. Only **metric measurement** units will be allowed. A reference sheet for metric measurement is included in this packet.

The first deadline for science fair is **Wednesday, October 16.**

All experimental design forms should be submitted on or before Wednesday, October 16, 2019. It includes the experimental question the experiment is designed to answer. The experimental question should have a form similar to "What is the affect of increasing the amount of *(your independent variable)* on *(your dependent variable)*?" There should be increasing or decreasing amounts of your independent variable.

The hypothesis is different from the experimental question because it offers a logical answer to the question, based on the background research. The experiment tests if the hypothesis is correct. It should follow if, then, because format that has been practiced in class.

The independent variable, dependent variable, constants and control must be identified for this form. A method for measuring the dependent variable for results must be clearly explained.

Materials needed for the experiment must be listed. Specifically describe all materials and equipment. Try to be as specific as possible at this time. Add specifics to logbook when available. When purchasing supplies, be sure buy more than enough to avoid switching batch or lot numbers.

A brief description of the procedure should be included. It does not need to be the entire, step-by-step process but should be more a summary written in paragraph format. It should make clear the main way that the hypothesis will be tested.

EDs that are accepted will be returned and work can begin on researching the experiment. EDs that are conditionally accepted will be returned with suggested changes. The form will need to be updated and resubmitted no later than **October 28, Monday.**

EDs that are not accepted will be returned and a conference will be held with the student to help suggest another experiment.

Logbook:

All students must have a logbook for only science fair work. The logbook is a diary of all activities and work related to the project. Logbooks show the scientific community the experiment was yours and completed in sequence. Logbooks will be part of the project grade and checked in class on scheduled days.

A standard size composition book (with no added decorations to cover) will work well. Each page should be numbered. Pages should never be ripped out. Write in pen. Initial and date each entry. Mistakes should be crossed out with a single line across. Please initial and date any changes. Ring binders, spiral notebooks and loose-leaf are not acceptable.

Logbooks are to be brought to class on **October 29, Monday. They will be initially set up in class on this day. Bringing the logbook to class that day will be worth 10 points.**

Please use the following Logbook format:

Page 1	Title page- topic, student name, school, grade level.
Page 2	Table of contents- enter page numbers and section titles
Page 3	Hypothesis
Page 4 to 13	Research Bibliography (use correct format)
Page 14	Materials
Page 15 to 17	Procedure
Page 18	Daily log/Observations/Data Analysis

Background Research:

After the project has been approved, research must be done to understand the science behind your experiment. The research should logically lead to the hypothesis, based on what people already know about the topic. Record bibliography information for all information sources starting on page 4 of your logbook. Use one page for each source. Take notes into the logbook on each source's listed page. Two pages for each source have been allotted for note taking. Note the date and research work you do in the daily log section of your logbook.

Experiment Update Form:

The experiment update form is due on or before **Monday, November 11, 2019**.

The form shows background research progress. A minimum of five sources is required at this time, one non-internet and not textbook. Wikipedia will not be accepted as a source.

Research Paper and Bibliography:

The Research Paper and Bibliography will be due on or before **Monday, December 2, 2019**. The introduction should explain the scientific information someone will need to know to understand the experiment. Organize the background information to move logically toward your experimental question. Do not simply explain your procedure rather explain the science behind your experiment. A good Introduction should start out explaining the topic and science involved with this topic, then move on to a brief explanation of procedure and end with a short paragraph stating your hypothesis. The introduction should be a minimum of 1 page using Times New Roman size 12 Font. Margins should be no more than 1-inch top/bottom and 1.25 inches on the sides.

The Bibliography must be on a separate page and follow the correct format included in the directions of this packet. **The Research Paper and Bibliography will receive a test level score for the grading period.**

The Experiment:

Experiments should be completed by **Tuesday, January 14, 2020**. There will be a logbook check on this date to check progress. All experimentation should be complete at this point. This will allow time to focus on the written portions of the Science Fair and will also allow time to repeat experiments in case of "disaster". Follow procedures carefully. Record results as data measurements and observation/descriptions. Try to run the experiment more than once. Each time the experiment is run is a trial. Completing several trials helps ensure the results are accurate. Data must be recorded in ink in the logbook. Record this information as the experiment is conducted. Initial and date each entry.

Data Analysis: Data (measurements) should be organized into charts and graphs. Statistic (mean, median, mode, range, percent error) should be used where appropriate**. In the logbook, all charts and data table must be handwritten or drawn in ink. Graphs are not included in the logbook.**

Final Science Fair Report:

The final report **must be typed**. Use Times New Roman size 12 Font. Top and bottom margins are 1 inch. Side margins are 1.25 inches. Sections should be identified with a subheading, but continue on the same page. A copy of the **final report** to be graded is due **January 29, 2020**. This will receive a test level score for third quarter.

Final Report Sections:
∗Research Paper- 1 page minimum
∗Materials- typed as a list
∗Procedure- number and describe the specific steps to exactly duplicate your experiment
∗Observations/Data- descriptions of the experiment in paragraph form, charts and graphs
∗Data Analysis- discuss results in a paragraph or two, discuss problems and their effect. Be specific. Refer to the numbers you got from the experiment or refer to observations that you made during the experiment. Refer to the graphs or charts in this summary.
∗Conclusion- summarized expectations and actual results, discuss patterns, discuss possible next steps for future experiments, and discuss real world applications of results
∗Bibliography- start on a new page, follow correct format
∗Abstract- a 1 page/ 3 paragraph summary: purpose, procedure summary, data/conclusion
Abstract writing will be explained and practiced in class.

Backboard Display and Binders: Examples to be discussed in class in January. Only standard size tri-fold boards of cardboard or foam core are acceptable. Title headers are allowed. Please note the Diocese is moving away from displays of items and more toward photographs on the board itself. It is strongly encouraged that the student not bring display items but simply use the board as their prop to explain their experiment.

February 4, 2020, Tuesday—Binder, Logbook and Display Board due in homeroom.

Abstract: Abstracts should be limited to ONE PAGE, 12 point font, Times New Roman, 250 words. It should be typed single-spaced on plain white paper. Abstracts should contain the following heading in the upper-left hand corner:

Name
Grade, St. Anthony of Padua School
Falls Church
Mrs. Miller
Category
Title

The Abstract should include 3 paragraphs: purpose, procedure and conclusion. Abstract writing will be practiced in class and examples shown to the students. **A draft of the abstract will be due in class on January 24, 2020 and will count as a quiz grade.**

DIOCESAN SCIENCE FAIR

CATEGORY DESCRIPTIONS

1. **Behavioral and Social Science** – Human behavior, social and community relationships.

2. **Biochemistry** – Chemistry of life processes-molecular biology, molecular genetics, photosynthesis, food chemistry, hormones, enzymes, etc.

3. **Botany** – Study of plant life-agriculture, horticulture, forestry, plant taxonomy, plant psychology, plant genetics, hydroponics, algae, etc. Please monitor projects to respect all life (plants and animals).

4. **Chemistry** – Study of nature and composition of matter and laws governing it.

5. **Computer Science** – Study and development of computer software and hardware and associated logical devices.

6. **Earth and Space Sciences** – Geology, mineralogy, psysiography, oceanography, meteorology, climatology, astronomy, speleology, seismology, geography, etc.

7. **Engineering** – Technology: projects that directly apply scientific principles to manufacturing and practical uses.

8. **Environmental Sciences** – Study of pollution (air, water, and land) sources and their control; ecology.

9. **Mathematics** – Development of formal logic systems or various numerical and algebraic computations, and the applications of these principles-calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability.

10. **Medicine and Health** – Study of diseases and health of humans.

11. **Microbiology** – Biology of microorganisms.

12. **Physics** – Theories, principles, and laws governing energy and the effect of energy on matter.

13. **Zoology –** Study of animals, including diseases, behavior, and health.

Please monitor projects to respect all life (plants and animals).

DISPLAY AND SAFETY REGULATIONS

Unacceptable for Display

1. Living organisms e.g. animals, microbes, plants, fruits, vegetables, food, soil, and gravel. No chemicals or OTC chemicals can be used for display. Photographs should be substituted for visual display.

2. Preserved vertebrate or invertebrate animals (includes embryos).

3. Waste samples.

4. Poisons, drugs, controlled substances, hazardous substances or devices (i.e. solids which vaporize to a gas without passing through a liquid phase).

5. Dry ice or other sublimating solids (i.e. solids which vaporize to a gas without passing through a liquid phase).

6. Sharp items (i.e. syringes, needles, pipettes) or any glass containers.

7. Flames or highly flammable display materials.

8. Empty tanks that previously contained combustible liquids or gases, **UNLESS** purged with carbon dioxide.

9. No open cell batteries.

10. Awards, medals, business cards, flags, etc.

11. Hand-outs to judges must be limited to one page narratives related to the essentials of this year's project. Personal photographs, accomplishments, acknowledgements, addresses and phone and fax numbers are <u>not</u> permitted.

12. Photographs or other visual presentation depicting vertebrate animals in other-than-normal conditions (e.g. surgical techniques, dissection, necropsies or other lab techniques).

13. Large vacuum tubes or dangerous ray-generating devices.

14. Liquids or food products.

15. Lasers.

Maximum Size of display Area must fit with these dimensions: 100cmwide, 35 cm deep. No equipment may be placed outside of display area; this includes the floor.

<u>NOTE</u>: Backboards are not provided by the Diocese.

Acceptable for Display Only
(cannot be operated.)

1. Projects with unshielded belts, pulleys, chains, and moving parts with tension or pinch points.

2. Any device requiring over 110 volts.

Acceptable for Display & Operations
(with restrictions)

1. Any apparatus producing temperatures that will cause physical burns must be adequately insulated.

2. Pressurized tanks that contain noncombustibles may be on display if properly secured.

3. High-voltage equipment must be shielded with a grounded metal box or cage to prevent accidental contact.

4. High-voltage wiring, switches, and metal parts must have adequate insulation and overload safety factors, and must be inaccessible to others.

5. Electric circuits for 110-volt AC must have a 50-ft (min) cord. The cord must have sufficient load-carrying capacity and be approved by Underwriters Laboratories.

6. Electrical connections in 110-volt circuits must be soldered or made with approved connectors. Connecting wires must be insulated. Greater than 110 volts is not permitted.

7. Bare wire and exposed knife switches may be used only in circuits of 12 volts or less; otherwise, standard enclosed switches are required.

8. Any item of significant value should not be left unattended and should be removed immediately after judging.

PROPERTY	MEASUREMENT UNIT	ABBREVIATION	INSTRUMENT USED
Acidity/Alkalinity	PH		pH paper, pH meter
Angle	Degrees	(°)	protractor, sextant, transit
Area	Meter^2 Centimeter^2 Millimeter^2	(m^2) (cm^2) (mm^2)	Meter stick and formula for regular objects, planimeter for irregular objects or indirect measurement for irregular objects
Density	Kilogram/meter^3 Grams/centimeter^3	(kg/m^3) (g/cm^3)	balance and meter stick, pycnometer, hydrometer
Electrical Current	Ampere	(amp)	Ammeter
Electrical Potential	Volt	(V)	Voltmeter
Electrical Resistance	Ohm	(Ω)	ohmmeter, Wheatstone bridge
Force	Newton	(N)	spring scale
Growth (special) Optical density Size of colony	Nanometer Number per square millimeter	(nm) (#/mm^2)	Photoelectric colorimeter marked grid or overlay
Heat	Joule	(J)	Calorimeter
Humidity	Percent	(%)	Hygrometer
Length	Meter Centimeter Millimeter Micrometer Angstrom	(m) (cm) (mm) (um) (A)	meter stick, tape measure micrometer, vernier caliper
Light intensity	Candle Lumen	(can) (lum)	photometer, light meter, photoelectric cell
Mass	Kilogram Gram Milligram Microgram	(kg) (g) (mg) (ug)	spring balance, lever-arm balance, electronic balance
Pressure	Pascal	(N/m^2)	barometer, manometer, mechanical pressure gauge
Sound intensity	Decibel	(db)	audiometer, sound level meter
Temperature	Degrees centigrade or Celsius	(°C)	thermometer, thermocouple, thermistor, pyrometer
Time	Seconds	(s)	stopwatch
Velocity	Meter/second	(m/s)	speedometer, anemometer, stopwatch and meter stick
Volume	Cubic meter Cubic centimeter	(m^3) (cm^3) (mm^3)	graduated cylinder, pipetter, burette, volumeter, manometer
Weight	Newton	(N)	spring scale

Science Fair 2019-202: Experimental Design Form

Due Date: Wednesday, October 16, 2019

Name_____ Homeroom_____

Category_____

Experimental Question: _____

_____

_____

_____

Hypothesis: _____

_____

_____

_____

Independent Variable: (You control and change the amount)
_____

Dependent Variable: (what you measure for results) _____

Control: (a zero value for the independent variable) _____

Constants: (other things that might affect your results if you don't keep them the same)

_____

_____

_____

How will you measure your dependent variable: _____

_____

Materials List:

_____

_____

_____

_____

Procedure:
Brief description of the experimental design that will be followed with this experiment.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

EXPERIMENTAL DESIGN IS: APPROVED-NO CHANGES_____

CONDITIONALLY APPROVED WITH THESE CHANGES:

_____

_____

_____

_____

NOT APPROVED: RESUBMIT BY OCTOBER 28, MONDAY._____

Science Fair 2019-2020 Experimental Update Form

Please list information on background research sources. Use correct bibliography format from science packet. Minimum required is five sources, one non-internet and not textbook. Wikipedia is not an acceptable resource.

1. _____

_____

Brief description: _____

_____

2. _____

_____

Brief description: _____

_____

3. _____

_____

Brief description: _____

_____

4. _____

_____

Brief description: _____

_____

5. _____

_____

Brief description: _____

_____

Due on/or Before: MONDAY, NOVEMBER 11, 2019.

Bibliography Formats:

Book:

Author's Name (last name first). Title of Book. City of Publication: Name of Publisher, Copyright Date.

King, Joe. A Short History of the Entire World. NY: Dell Publishing, 1998.

Two Authors:

Jones, Amy and Smith, Tom. My Life as a Teenager. Washington, DC: Benchmark Books, 1992.

Encyclopedia:

Author's Name (last name first). "Title of the Article." Name of the Encyclopedia. Volume Number, Copyright Date.

Henriquez, Sally. "Polar Bears." World Book. Vol. 16, 1999.

No Author available:

_____. "Polar Bears." Encyclopedia Americana. Vol. 14, 1998.

Magazine Article:

Author's Name (last name first). "Title of the Article." Magazine Name, Month Year, page numbers.

Mearns, Anna. "Home-Alone Bees." Ranger Rick, March 1995, pp.27-29.

Newspaper:

"Title of the Article." Newspaper Name, Day Month Year, section, page.

"Chinese Skater Glides to World Title." New York Times, 12 March 1995, sec. 8, p.4.

Internet Site:

Author's Name (last name first). "The Site Name." <The site address>. The date you went on.

Ho, Trang. "Mars, Our Closest Neighbor." < http://www.mars-is.mypage.htm > February 12, 2002.

_____. "Mars, Our Closest Neighbor." < http://www.mars-is.mypage.htm > February 12, 2002.

Personal Interview:

Mahoney, Evelyn. Dobbs Ferry Middle School, Dobbs Ferry, New York. Interview, 6 March 1995.