Ray Sr. and Maxine Szmanda Science Scholarship

Eligibility requirements for the Ray Sr. and Maxine Szmanda Science Scholarship are as follows:

1. Students must declare their intent to compete for the scholarship by **September 30th** of their senior year.
2. Experiment based projects in science are eligible if the project meets the requirements for the NCHS capstone project and is approved by their advisor and the capstone committee.
3. All senior capstone deadlines must be met unless the student negotiates an extension with the advisor PRIOR to the deadline.

4. ADVISOR
    a. The student's advisor must be a science teacher at Newman Catholic High School.
    b. Advisors may choose to limit the number of students they advise due to time commitments and work load. Please seek your advisor early in the process.

5. MENTOR
    a. The student's mentor must be a professional scientist, engineer, or doctor with expertise in the branch of science, engineering, or medicine on which the project focuses.
    b. Projects that have animal testing should have a veterinarian as a mentor.
    c. Projects that have human testing should have a mentor in the field of medicine in which the testing focuses.
    d. The mentor must agree in writing to be the student's mentor prior to designing the experiment. The written agreement must be kept by the student and turned into the advisor with the research paper.
    e. The mentor and student may not be related.
    f. Students are encouraged to find a mentor they do not know so they gain valuable experience making professional contacts.
    g. The mentor should be involved in the project by providing technical and professional support, but should NOT directly help with the hands-on portion of the experiment.
    h. Consultation with other experts is encouraged.

6. Experiment – Students must:
    a. perform an original experiment that is well beyond the scope of any labs or regular classroom activities,
    b. answer a question or problem by researching, designing, and carrying out an experiment,
    c. test a prediction (hypothesis) that is made prior to the experiment OR solve an engineering problem that meets pre-determined design specifications,
    d. keep a lab notebook with observations,
    e. take photographs during the project that will be included in the presentation,
    f. include a written safety plan (see 7 below),
    g. have the experiment approved by the advisor prior to any data collection.

7. Safety
    a. A safety plan must be written that addresses any potential environmental or personal safety hazards. If none exist, then a simple statement will suffice.
    b. If hazards exist, adults must be present when the experiment is performed.
    c. The plan must include:
        i. How potential hazards will be dealt with should they occur.
        ii. Clean up and disposal of any chemical and/or biological waste.

d. The plan must be approved prior to any data collection, use of equipment, chemicals, or live organisms (see section 8 below for use of animals)

8. Animals
    a. If animals, including humans, will be the subject of any experiment an experimental procedure must be approved prior to securing test subjects.
    b. A veterinarian must be the mentor of students who choose to do a project that involves any animal testing (this may be modified with advisor approval).
    c. In human tests, complete confidentiality must be maintained.
    d. Animals will be treated with the utmost care and respect; this includes feeding, water, clean living area, and adequate space.
    e. No animals may be purposefully killed for the experiment. Exceptions may be granted for certain dissections of mice or fish. These are not recommended.
    f. Lethal dose (LD) tests are banned.
    g. It is not recommended that experiments be performed where there is any lethal potential for the animal subjects.
    h. References for specific guidance on the use of animals can be found at:
        http://dels.nas.edu/Laboratory/Reports-Academies-Findings

9. Research paper – see Senior Science Project Research Paper Outline (Appendix-A)
    Unlike other research projects, science projects are to have the project integrated into the paper. The written paper serves as the "Introductory Summary," and your project should follow seamlessly from that. Be sure to study Appendix A and follow the format of an actual scientific publication.

10. Presentation - In addition to the NCHS presentation guidelines, students must include:
    a. slides in Microsoft PowerPoint or similar software,
    b. at least one graph or figure that shows the data collected (several recommended),
    c. several pictures of experiment and results,
    d. acknowledgements, and
    e. visually appealing slides that:
        i. are 'uncluttered', and
        ii. have easy to read font with particular attention to size and color

11. Szmanda Competition
    a. Preliminary competition
        i. The same evaluation team will watch and evaluate every scholarship candidate's presentation during the NCHS senior capstone presentations.
        ii. Evaluators will discuss each presentation and then vote for their top three.
        iii. Three or four candidates may be chosen as finalists if teachers think they have a reasonable chance to win the scholarship.
        iv. If no candidates present a high quality project, the scholarship will not be awarded that year. This decision will be made by evaluators, the capstone coordinator, scholarship committee and the administration.
        v. If only one candidate presents a high quality project deserving of the scholarship, no final presentation will be necessary, and the scholarship will be awarded. This decision will be made by evaluators, the capstone coordinator, scholarship committee and the administration.
        vi. Candidates must submit an abstract one week prior to the competition for inclusion in the final program.

b. Final competition
    i. Finalists will be given the judges' scoring sheet prior to the preliminary competition (Appendix-B).
    ii. No further experimentation/data collection may be done by finalists after the preliminary presentations.
    iii. Data may be re-analyzed and conclusions changed following the preliminary.
    iv. Finalists will present before a panel of judges.
    v. The final will be at least two weeks after the preliminary to give students a chance to polish their talk.
c. Judges
    i. Judges will be selected by the capstone coordinator, advisors will not serve as judges.
    ii. There will be an attempt to use professionals in the fields of science, engineering, and/or medicine to serve as judges.
    iii. Alumni are acceptable if there is no relation to the candidates.
    iv. Judges will be given a score-sheet for guidance prior to the competition (Appendix-B)
    v. Judges will meet immediately following the competition to determine the winner.
    vi. Judges must reach an agreement via secret ballot. A simple majority wins, therefore an odd number of judges is recommended.
    vii. The winner's name will be placed in a labeled envelope and delivered to the guidance counselor.
    viii. The winner will not be announced until the senior awards ceremony in May.

APPENDIX-A

Newman Catholic High School
Senior Science Project Research Paper Outline

The Newman Catholic High School Science Department recommends that your Senior Science Project research paper be written according to the outline below.

Introductory Summary
In this section you write an introductory summary of your Senior Science Project. By reading this section, the reader should have a basic understanding of what your Senior Science Project was about. Questions to briefly answer in this section include:

- What was your project about?
- What did you want to find out?
- What research and experiments did you do?
- What were the key findings of the project?

*Hypothesis**
Your hypothesis should immediately follow the summary and should include a one sentence affirmative statement that will either be accepted or rejected upon the conclusion of your research. Be sure to give specific and measurable criteria based on your research for accepting or rejecting your hypothesis.

*Background**
The background section is where you provide *detailed* information about what your project is about. The aim of the background section is to help the reader understand the science concepts that your project is investigating and how these concepts relate to the experiments you did. Information for the background section should come from literature, peer-reviewed journals, on-line searches, your mentor, and other sources. Be sure to also include scientific laws and principles, pertinent formulas, and discussion of how your research came about as necessary.

*Experimental Procedure**
In this section you describe the overall methods and procedures you used to conduct your experiments. Include a summary of the materials and apparatus you used, the conditions the experiments were performed under, the nature of the samples used, sample sizes used, and which conditions were varied (the variables) and which remained constant (the control).
Diagrams or pictures of experimental set-ups and apparatus used are helpful.

Analysis and Results
This section describes how you analyzed the data from your experiments and states the results of your analysis. Your analysis should be supported by statistical calculations, data tables, graphs, and diagrams as necessary. It is recommended that you provide key examples of your data analysis if you've collected and analyzed a large amount of data. In this case, the complete set of your data and the analyzed results should be moved to the Appendix.

Conclusions
In this section you develop and state conclusions based on the results you found earlier. The conclusions section should aim to answer the following:

- Did you accept or reject your hypothesis?
- Which data caused you to accept or reject your hypothesis?
- Did the experiment lead you to formulate new hypotheses or to consider future investigations?

You should also discuss the errors associated with your experiments, including data-related errors and errors in procedure.

Appendix
The appendix should include a literature cited and bibliography section, parenthetical references, and may include additional data you collected and analyzed, as well as additional background information.

* These sections of the paper should be written prior to collecting data. Advisors may allow exceptions in rare instances.

Appendix-B (Used by the judges)

Ray Sr. and Maxine Szmanda Science Scholarship - General Scoring Guidelines

Candidate name: _____

Project title: _____

1. Experiment (20/100) ----------→_____/20
   a. Originality – beyond typical high school lab/design work

   b. Design and redesign (if needed)

2. Data Analyses & Conclusions (40/100) ----------→_____/40
   Candidate:
   a. Discusses data with respect to hypothesis or engineering problem*

   b. Demonstrates understanding of data

   c. Conclusions are logical extensions of the data/results

   d. Explains limitations of results (error, weakness in design)

3. Presentation (10/100) ----------→ _____/10
   a. Graphs and visuals – easy to read, formatting

   b. Speaking skills – Volume, clarity, pace, eye contact, engages audience

4. Questions and Answers (30/100) ----------→ _____/30
   Candidate:
   a. Clarifies data analyses and conclusions

   b. Applies concepts beyond scope of project

   c. Demonstrates ability to 'think on feet' & under pressure

Total → _____/100

* Please give equal weight to hypothesis and engineering problems since students can choose either type of project.

Appendix-C Past scholarship recipients

This scholarship has been awarded since 1992. Recipients since 2000 are as follows:

2019 Sarah Sukanen – Cell Phone Radiation Effect on Plants
2018 Sarrianna Hoffer – Learning ability effected by peers when training mice
2017 Hannah Meyer – Probiotics vs. Lactose Pills
2016 Taylor Hackel – The Effects of Music on Cellular Metabolism and Growth
2015 Maddi Nieuwenhuis – Shoeing's Effects on Equine Hoof Health
2014 Lily Ward – Bacterial Resistance to Antibiotics
2013 Jordon Knudtson – The Differences Between Composite and Wood Golf Drivers
2012 Adam Hoffman – Engineering a trebuchet
2011 Erin Kast – Invasive Earthworms at the Rudolph Environmental Center
2010 Caitlyn Bastable – Effect of sports drinks on blood glucose levels of athletes.
2009 Cristen Norman – The effects of air temperature variance on memory ability.
2008 Mary Murphy - Physics of Sand, Talus Deposits, and the Angle of Repose
2007 Malinda Hoffman – A comparison in mussel populations in the Eau Claire River
2006 Ben Borowicz – Tensile strength of fishing line
2005 Karen Klosinski - Effects of different colors of light on plant growth
2004 Leah Gross – The effects of smoking on the brain
2003 Meng Lor - Terraforming Mars: turning the red planet into a green one
2002 Jeremy Goetsch – A comparison of night time driving vision by age group.
2001 Brooke Whyte – Botox as a treatment for the symptoms of Cerebral Palsy
2000 Lindsey Rentmeester