# TABLE OF CONTENTS

**Click on Headings to Jump to Specific Topics**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE OF CONTENTS</td>
<td>2</td>
</tr>
<tr>
<td>PRE-FACE</td>
<td>4</td>
</tr>
<tr>
<td>SUPPORTERS</td>
<td>4</td>
</tr>
<tr>
<td>VJAS SCHOLARSHIPS AND AWARDS</td>
<td>4</td>
</tr>
<tr>
<td>DATES TO REMEMBER</td>
<td>4</td>
</tr>
<tr>
<td>VJAS HANDBOOK REVISIONS</td>
<td>5</td>
</tr>
<tr>
<td>I. INTRODUCTION TO THE VJAS</td>
<td>6</td>
</tr>
<tr>
<td>A. AFFILIATION AND OBJECTIVES</td>
<td>6</td>
</tr>
<tr>
<td>B. HISTORY OF THE VJAS</td>
<td>6</td>
</tr>
<tr>
<td>II. MEMBERSHIP</td>
<td>8</td>
</tr>
<tr>
<td>A. BENEFITS</td>
<td>8</td>
</tr>
<tr>
<td>B. SPONSORS</td>
<td>8</td>
</tr>
<tr>
<td>C. HOW TO PARTICIPATE: MEMBERSHIP AND ENTRY FEES</td>
<td>9</td>
</tr>
<tr>
<td>III. CATEGORIES</td>
<td>13</td>
</tr>
<tr>
<td>A. MIDDLE SCHOOL CATEGORIES</td>
<td>13</td>
</tr>
<tr>
<td>B. HIGH SCHOOL CATEGORIES</td>
<td>14</td>
</tr>
<tr>
<td>IV. CONDUCTING THE RESEARCH</td>
<td>16</td>
</tr>
<tr>
<td>A. ETHICS AND INDIVIDUALITY OF WORK</td>
<td>16</td>
</tr>
<tr>
<td>B. PLANNING AND DESIGNING THE RESEARCH</td>
<td>16</td>
</tr>
<tr>
<td>C. SAFETY AND RECORD KEEPING</td>
<td>17</td>
</tr>
<tr>
<td>D. FINANCIAL SUPPORT</td>
<td>17</td>
</tr>
<tr>
<td>V. REGULATIONS AND CERTIFICATIONS FOR RESEARCH</td>
<td>18</td>
</tr>
<tr>
<td>A. VERTEBRATE ANIMAL EXPERIMENTS</td>
<td>18</td>
</tr>
<tr>
<td>B. HUMAN SUBJECT RESEARCH</td>
<td>20</td>
</tr>
<tr>
<td>C. RECOMBINANT DNA RESEARCH REGULATIONS</td>
<td>22</td>
</tr>
<tr>
<td>D. CELL AND TISSUE RESEARCH</td>
<td>22</td>
</tr>
<tr>
<td>E. PATHOGENIC AGENTS, TOXIC OR CONTROLLED SUBSTANCES</td>
<td>23</td>
</tr>
<tr>
<td>F. MENTORED RESEARCH and/or RESEARCH CONDUCTED in a RESEARCH INSTITUTION</td>
<td>24</td>
</tr>
<tr>
<td>VI. PREPARATION AND PRESENTATION OF PAPERS</td>
<td>24</td>
</tr>
<tr>
<td>A. WRITING THE PAPER</td>
<td>24</td>
</tr>
<tr>
<td>B. THE PAPER COMPONENTS</td>
<td>26</td>
</tr>
</tbody>
</table>

[Return to Table of Contents]
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. PAPER PROCESSING</td>
<td>29</td>
</tr>
<tr>
<td>Upon Submission in Reviewr</td>
<td>29</td>
</tr>
<tr>
<td>Processing and Screening</td>
<td>29</td>
</tr>
<tr>
<td>F. NOTIFICATION AND SYMPOSIUM PREPARATION</td>
<td>30</td>
</tr>
<tr>
<td>G. PRESENTATION OF THE PAPER</td>
<td>30</td>
</tr>
<tr>
<td>H. ABSTRACT SUBMISSION AND PUBLICATION</td>
<td>32</td>
</tr>
<tr>
<td>VII. AWARDS</td>
<td>32</td>
</tr>
<tr>
<td>A. SECTION AWARDS</td>
<td>32</td>
</tr>
<tr>
<td>C. SPECIAL INTEREST AWARDS</td>
<td>34</td>
</tr>
<tr>
<td>D. VJAS HONOR AWARDS</td>
<td>36</td>
</tr>
<tr>
<td>VIII. SCHOLARSHIPS</td>
<td>40</td>
</tr>
<tr>
<td>IX. OPERATION OF THE VJAS</td>
<td>42</td>
</tr>
<tr>
<td>A. VJAS COMMITTEE</td>
<td>42</td>
</tr>
<tr>
<td>B. RESEARCH SYMPOSIUM AND ANNUAL MEETING</td>
<td>43</td>
</tr>
<tr>
<td>C. JUNIOR ACADEMY OFFICERS</td>
<td>43</td>
</tr>
<tr>
<td>D. VJAS PUBLICATIONS</td>
<td>46</td>
</tr>
<tr>
<td>E. GENERAL RULES AND CODE OF CONDUCT</td>
<td>46</td>
</tr>
<tr>
<td>Appendix</td>
<td>48</td>
</tr>
<tr>
<td>i - Submission and Paper Formatting Check-list</td>
<td>48</td>
</tr>
<tr>
<td>SUBMISSION CHECK-LIST</td>
<td>48</td>
</tr>
<tr>
<td>PAPER FORMATTING CHECKLIST</td>
<td>48</td>
</tr>
<tr>
<td>ii - DQ Criteria</td>
<td>50</td>
</tr>
<tr>
<td>VJAS Paper Disqualification Form</td>
<td>50</td>
</tr>
<tr>
<td>iii - Reviewr Instructions for Sponsors (See Posted Sponsor’s Updates)</td>
<td>52</td>
</tr>
<tr>
<td>vi - Student Officer Application</td>
<td>53</td>
</tr>
<tr>
<td>vii - Phil Robinson Research Grant Application</td>
<td>54</td>
</tr>
<tr>
<td>Guidelines for the Phil Robinson Research Grant Application</td>
<td>54</td>
</tr>
<tr>
<td>PHIL ROBINSON RESEARCH GRANT APPLICATION</td>
<td>55</td>
</tr>
<tr>
<td>viii. Reader’s Scoring Rubric (on Reviewr; posted here for reference)</td>
<td>56</td>
</tr>
<tr>
<td>IX. Judge’s Scoring Rubric (on Reviewr; posted here for reference)</td>
<td>57</td>
</tr>
</tbody>
</table>
**PRE-FACE**

**SUPPORTERS**
The Virginia Junior Academy of Science notes with appreciation the contribution and support of the hundreds of individuals and the many organizations to the success of the Junior Academy.

VJAS programs need support from industries, organizations, and individuals in Virginia. Gifts to the Junior Academy qualify as charitable contributions, which entitle a donor to federal income, estate, and gift tax exemptions under the IRS code. All fundraising efforts must be cleared through the chair of the Fundraising Committee of the Virginia Academy of Science.

**VJAS SCHOLARSHIPS AND AWARDS**
The Virginia Environmental Endowment
Bethel High School Science Club
 Dominion Energy
The Virginia Academy of Science
American Cancer Society
Virginia Sea Grant College Program
Richmond Area Speleological Society
Virginia Chapter, National Foundation for Infectious Diseases
American Junior Academy of Science
American Association for the Advancement of Science
National Association of Academies of Science
Virginia Tech Chapter, Gamma Sigma Delta (Agriculture)
Jeffers Fund
Genetics Award
Dr. and Mrs. Preston Leake
Catesby Jones Fund
Carpenter & Berry Funds

**DATES TO REMEMBER**

<table>
<thead>
<tr>
<th>Event</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadline for affiliation with VJAS: School and Individual Memberships and Membership Fees</td>
<td>Must be received in the VAS Office by January 15, 2022</td>
</tr>
<tr>
<td>Deadline for submitting papers and Student Entry Fees</td>
<td>All papers, entry fees and entry forms must be submitted by Wednesday, March 2, 2022</td>
</tr>
<tr>
<td>Event Description</td>
<td>Deadline/Information</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Deadline for Sponsors to go into Reviewr and confirm submitted papers</td>
<td>All papers must clear Sponsor’s Review by <strong>Wednesday, March 9, 2022</strong></td>
</tr>
<tr>
<td>Notification of meeting participants</td>
<td>Check website (<a href="http://www.vjas.org">www.vjas.org</a>) <strong>beginning April 15</strong></td>
</tr>
<tr>
<td>Notification of meeting registration, food, and lodging costs plus due date to the host institution</td>
<td>Check website (<a href="http://www.vjas.org">www.vjas.org</a>) <strong>beginning April 15</strong></td>
</tr>
<tr>
<td>Deadline for sponsors to <strong>confirm</strong> the participation of all of their accepted students and to notify the VJAS Office of any student(s) that cannot participate</td>
<td>By email to the VJAS Associate Director by <strong>April 30.</strong></td>
</tr>
<tr>
<td>Deadline for applications for Junior Academy Officers</td>
<td><strong>Submitted to Reviewr</strong> by <strong>April 30.</strong></td>
</tr>
<tr>
<td>Deadline for receipt of Honor Award Applications and most* Scholarship Applications</td>
<td><strong>Submitted to Reviewr</strong> by <strong>April 30.</strong></td>
</tr>
<tr>
<td>*Deadline for receipt of the VEE (F. &amp; S. Lewis and H. MacKenzie) Scholarship Applications</td>
<td><strong>Submitted to Reviewr</strong> by <strong>April 30.</strong></td>
</tr>
<tr>
<td>VJAS Research Symposium &amp; Annual Meeting</td>
<td><strong>Student Presentations: Saturday, May 14, 2022 in Zoom concurrent virtual rooms hosted by The College of William &amp; Mary.</strong></td>
</tr>
</tbody>
</table>

**VJAS HANDBOOK REVISIONS**

<table>
<thead>
<tr>
<th>Edition</th>
<th>Author</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Handbook, 1963</td>
<td>Marc Salzberg</td>
<td>Norfolk Academy</td>
</tr>
</tbody>
</table>
### I. INTRODUCTION TO THE VJAS

#### A. AFFILIATION AND OBJECTIVES

The Virginia Junior Academy of Science (VJAS) is directly sponsored by the Virginia Academy of Science (VAS). The objectives of the VJAS are to (1) discover and encourage scientific aptitude among secondary school students [grades 7 through 12] in Virginia, (2) foster fellowship between its members and members of the VAS, (3) encourage students to continue their education in science, engineering and related fields, and (4) develop a background among its members which will lead to membership in the Virginia Academy of Science and other professional science organizations.

#### B. HISTORY OF THE VJAS

In 1938 the VAS served as host to the annual meeting of the American Association for the Advancement of Science in Richmond, Virginia. One important event discussed at this meeting was the rapid development of science clubs in high schools throughout the country, especially the organized associations of science clubs in New York City.
The VAS became interested in these association's accomplishments, and Dr. Ruskin S. Freer, the incoming president of the VAS, appointed a committee under Dr. L. C. Bird to initiate such work in Virginia. At a meeting in Dean Hortley F. Rudd's office on June 5, 1940, two committees were formed to direct the activities of VJAS - the Virginia Junior Academy of Science Committee and the Virginia Academy of Science Sponsoring Committee.

Invitations to join the VJAS were mailed to all science clubs that had indicated interest, and charters for the VJAS were printed. On May 3, 1941, the first meeting of the VJAS was called to order in Richmond by Mr. Hubert J. Davis, chairman of the VJAS Committee. More than two hundred high school students, delegates from member clubs, visiting officers of the VAS, and guests were present.

Since this first meeting, the VJAS has initiated and promoted a variety of important programs, including an annual meeting, the presentation of awards, sponsoring radio science quiz shows, the publication of scientific documents, and preparation of a VJAS film (now replaced by a video) to encourage science students in Virginia. The VJAS has grown rapidly from a nucleus of 17 clubs to over 100 affiliated schools. Many of the Senior Academy members instrumental in the formation of the VJAS have maintained their interest in its progress and have continued to guide its affairs. Financial support has been provided by organizations and individuals throughout the Commonwealth.

Appreciation is expressed to the following people who have chaired the VJAS Committee and served as Director, and have labored faithfully through the years to assure VJAS’s growth to its present status:

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. H. J. Davis</td>
<td>1941-47</td>
</tr>
<tr>
<td>Mr. F. G. Lankford</td>
<td>1947-49</td>
</tr>
<tr>
<td>Dr. Boyd Harshbarger</td>
<td>1949</td>
</tr>
<tr>
<td>Mr. B. W. Cooper &amp; Mr. Floyd S. Andrews</td>
<td>1950</td>
</tr>
<tr>
<td>Mr. Grover Everett</td>
<td>1951</td>
</tr>
<tr>
<td>Mrs. Thelma C. Heatwole</td>
<td>1952-60</td>
</tr>
<tr>
<td>Dr. W. W. Scott</td>
<td>1960-64</td>
</tr>
<tr>
<td>Dr. E. L. Wisman</td>
<td>1964-72</td>
</tr>
<tr>
<td>Dr. Lee Anthony</td>
<td>1972-75</td>
</tr>
<tr>
<td>Dr. John L. Hess</td>
<td>1975-78</td>
</tr>
<tr>
<td>Dr. A. B. Neimeyer, Jr.</td>
<td>1978-80</td>
</tr>
<tr>
<td>Dr. R. Dean Decker</td>
<td>1980-92</td>
</tr>
<tr>
<td>Mr. Donald R. Cottingham</td>
<td>1992-97</td>
</tr>
<tr>
<td>Dr. Eugene Maurakis, Associate Director</td>
<td>1994-95</td>
</tr>
</tbody>
</table>
The VJAS continues to expand to meet the needs of the student participants. Student officers are available at the Annual Meetings to record your concerns (constructive criticism and ideas) about the VJAS.

II. MEMBERSHIP

A. BENEFITS

The VJAS, through its active statewide programs, serves as an effective stimulus for scientific research by sponsoring programs for the advancement of science in grades 7 through 12 and by encouraging students to enter scientific research investigations in competition for awards at the annual VJAS Research Symposium. Students, grades 7 through 12, are eligible to submit their research papers to the Research Symposium. If accepted students are expected to attend the Symposium, participate in the Annual Meeting, present their papers and compete for numerous honors and awards.

The VJAS provides a means for students to meet others of similar ages, intents, and ambitions from the Commonwealth. The Research Symposium of VJAS provides an opportunity for students to attend; lectures by professional scientists, scientific paper sessions of the VAS, and research presentations by their peers.

B. SPONSORS

Recognition is given to all of the teachers, students, parents, sponsors, administrators, committee members, mentors and countless other volunteers who unselfishly spend
thousands of hours assisting the participants in conducting research, writing and processing their papers. The Virginia Junior Academy of Science notes with appreciation the contribution and support of the many sponsors who work with students throughout the Commonwealth. They are the key to the success of the Junior Academy and we rely on them in three ways.

1. The **Head Sponsor** serves as the point of contact for a school with the VJAS. The responsibilities are as follows.
   - **Submits** the **School Membership Application and Membership Fee**, described below in part C.
   - **Submits** the **research papers and Student Entry Fees** for the school and completes the **School Entry Form**.
   - **Registers** students (with the host institution), whose papers have been accepted, for the Research Symposium
   - **Co-signs** (along with Student Sponsor) **applications** for Special Interest Awards and/or Scholarships.
   - All signatures may be electronic.
   - Accompanies/chaperones those students from the school who will be attending the Research Symposium. In the event that the Head Sponsor is unable to attend the meeting, then he/she is responsible for finding another teacher to serve in this important capacity.

2. The **Student Sponsor** is the specific school teacher serving as the advisor for an individual student’s research project. The student sponsor has direct knowledge of what the student is working on and provides guidance for the project. The Student Sponsor:
   - **Signs** the **Student Entry Form** for each student submitting a paper.
   - **Signs** all appropriate “**Certifications**” on the “Certification Statement Form”.
   - **Co-signs** (along with Head Sponsor) **applications** for Special Interest Awards and/or Scholarships.
   - All signatures may be electronic.
   - Note: In a mentored project (see section V.F. for further information on mentored projects), the **Student Sponsor** is the person in the student’s school who has the above responsibilities.

3. The **Officer Sponsor** is the teacher that advises and encourages the current Student Officer(s) of the VJAS from his/her school. The responsibilities are:
   - To serve a one-year membership on the VJAS Committee.
   - To provide transportation for the officer(s) to and from VJAS Committee meetings and, if necessary, the Research Symposium
   - To participate in the work of the Committee by attending VJAS Committee meetings and supporting the activities of the officers.

C. **HOW TO PARTICIPATE: MEMBERSHIP AND ENTRY FEES**

1. **Types of Membership**. Two types of membership in the VJAS are available:
   a. **School Membership**: $50.
● This is open to any secondary school, middle school or high school (grades 7 through 12) in Virginia. This type of membership is encouraged.
● The **Head Sponsor** of the school is responsible for completing and submitting the school Membership Application and $50 membership fee for the school, which is due January 15. This submission process is to be completed using the Reviewr platform. Payment may be made online by credit card or by check. If paying by check, the check number will need to be supplied in the Reviewr payment portal. *See Membership Note 3 below.*

b. **Individual Membership: $10.**

- This membership category is normally intended for homeschooled students (grades 7 through 12) in Virginia. In addition, a student (in grade 7-12) who attends a public or private school that will not be joining VJAS as a School Member for the current year may be allowed to become a VJAS Individual Member.
  
  - Note: Prior to submitting the VJAS Individual Membership Application, it is strongly recommended that the parent/guardian contact the VAS Office Staff at vasoffice@vacadsci.org and request more information about the specific requirements for this membership category.

- The **parent/guardian of the student** must be listed as the legally responsible party on the Membership Application. The parent fills the role of the Head Sponsor for a School Member (as previously described) and is responsible for completing and submitting the individual Membership Application and $10 membership fee, which is due January 15. This submission process is to be completed using the Reviewr platform. Payment may be made online by credit card or by check. If paying by check, the check number will need to be supplied in the Reviewr payment portal.

- The parent/guardian should also list a **Student Sponsor** (see description under School Membership) on the Membership Application who is the project advisor and signs the required VJAS paper submission forms. If this person is not a science teacher he/she should have an appropriate scientific background to properly advise the student. With an appropriate background, the parent of a homeschooled student could serve as the student sponsor.

- VJAS strongly encourages school membership, with one designated teacher as a "Head Sponsor" for primary contact and communication, for participation in our Annual Meeting & Research Symposium. However, in a case where the school is not interested in becoming a member OR is unable to become a member for participation (e.g. no designated "Head Sponsor", skipping this year's VJAS due to costs, etc.), students in those schools still interested in participating in VJAS may submit an individual membership, with their parents as sponsors. To avoid confusion, check early in the school year with your teacher/science department to see whether your school intends to participate in VJAS. The parent/guardian (or Student Sponsor) must accompany / chaperone any student who will be attending the Research Symposium.

2. **Invoices and Late Fees.**
a. **Invoices** are available upon request from the associate director. To avoid a penalty, requests must be made in time to ensure meeting the January 15 deadline for submission of fees.

b. There will be a late fee of **20%** for all membership fees received after January 15:
   - School Membership late fee = $10.
   - Individual Membership late fee = $2.

3. **Membership Notes.**
   a. The **Membership Applications** are available and submitted through the Reviewr platform.

   It is important that all School and Individual Membership Applications and Membership Fees be submitted on Reviewr by the January 15 deadline. This will ensure that all School Head Sponsors and all parents/guardians of Individual Members will receive key reminders and other information about the upcoming VJAS Paper Submission process and deadline.

   b. If a student who attends a public or private school is applying for the Phil Robinson Research Grant (due November 1), then a teacher at the student’s school must submit the School Membership Application and Membership Fee for the school no later than November 1. If a homeschooled student is applying for the Phil Robinson Research Grant, then the student’s parent/guardian must submit the Individual Membership Application and Membership Fee for the student no later than November 1.

   c. Fees are subject to change by the VJAS Committee on an annual basis. Upon receipt of Membership Applications and payment of the appropriate Membership Fees, a certification of membership will be issued from the VAS office.

4. **Student Entry Fees.** An Entry Fee is required for each student submitting a paper and is due with the submission of the paper. All Entry Fees must be received by the paper submission deadline; the paper submission deadline for the current year is **Wednesday, March 2, 2022**. Invoices are available by request.

   a. **Members** (students from Member Schools and Individual Members). **$15 per student.**
      - Member Schools can submit a single check (single payment) for all of the entry fees received from the students from its school. This option must be selected when the school is paying for their membership in Reviewr. Otherwise, students will be responsible for their entry fee upon submission of their project.
      - The parent/guardian of an Individual Member should pay online with a credit card or check using the Reviewr site.

   b. **Non-Members at the time of VJAS Paper Submission on March 2, 2022.**
• **For schools that are not members:** School should submit a $60 School Membership Fee (includes $10 late fee) plus $15 Student Entry Fee for each student paper submitted. Must also submit a School Membership Application along with the School Entry Form. This submission process is to be completed using the Reviewr platform. Payment may be made online by credit card or by check. If paying by check, the check number will need to be supplied in the Reviewr payment portal.

• **For individuals who are not members:** The parent/guardian should submit a total of $27 ($10 Individual Membership Fee per student plus $2 late fee plus $15 Student Entry Fee). Must also submit an Individual Membership Application along with the Individual Entry Form. This submission process is to be completed using the Reviewr platform. Payment may be made online by credit card or by check. If paying by check, the check number will need to be supplied in the Reviewr payment portal.

6. Summary

<table>
<thead>
<tr>
<th>Membership &amp; Fee:</th>
<th>Paper Submission &amp; Fee:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>January 15</strong></td>
<td><strong>March 2</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Invoices for fees are available upon request from the VJAS Office.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School Membership</strong></td>
</tr>
<tr>
<td>Head Sponsor submits School Membership Application* and $50 Fee by January 15 by Reviewr platform. <em>(Late fee = $10.)</em></td>
</tr>
<tr>
<td>1. All papers for the school,</td>
</tr>
<tr>
<td>2. School Entry Form,**</td>
</tr>
<tr>
<td>3. $15 Entry Fee per student.</td>
</tr>
<tr>
<td><strong>Individual Membership</strong></td>
</tr>
<tr>
<td>Parent submits Individual Membership Application* and $10 Fee by January 15 by Reviewr platform <em>(Late fee = $2.)</em></td>
</tr>
<tr>
<td>1. Paper,</td>
</tr>
<tr>
<td>2. Individual Entry Form,**</td>
</tr>
<tr>
<td>3. $15 Entry Fee.</td>
</tr>
<tr>
<td><strong>Non-Member School (at time of VJAS paper submission)</strong></td>
</tr>
<tr>
<td>School submits the following:</td>
</tr>
<tr>
<td>1. School Membership Application,*</td>
</tr>
<tr>
<td>2. $60 School Membership Fee</td>
</tr>
<tr>
<td>3. Student Papers</td>
</tr>
<tr>
<td>4. School Entry Form** and,</td>
</tr>
<tr>
<td>5. $15 Student Entry Fee for each student paper</td>
</tr>
<tr>
<td><strong>Non-Member Individual (at time of VJAS paper submission)</strong></td>
</tr>
<tr>
<td>Parent submits the following:</td>
</tr>
<tr>
<td>1. Individual Membership Application,*</td>
</tr>
<tr>
<td>2. $12 Individual Membership Fee</td>
</tr>
<tr>
<td>3. Paper,</td>
</tr>
<tr>
<td>4. Individual Entry Form** and,</td>
</tr>
</tbody>
</table>
III. CATEGORIES

The VJAS provides competition in scientific research for students in grades 7 through 12. In 2012, this competition was divided into separate categories for middle school students and high school students.

- It is very important to make sure that students are not only entered in the proper age-appropriate category, but also in the proper subject-appropriate category. Papers placed in an inappropriate category will be disqualified.
- In the event, there are too few submissions to justify a full category, the VJAS Committee Chair and/or VJAS Director shall have the right to combine and merge similar categories. Sponsors will be notified by email of any category changes.
- In the event, there are enough papers submitted within any one category to justify the creation of a new category the VJAS Committee Chair and/or VJAS Director shall have the right to split the category. For instance, in the Engineering (EGR) category, if there are enough papers related to materials science engineering and engineering design to warrant separate categories, it is the discretion of the VJAS Director and/or VJAS Committee Chair to split this into Engineering - A (design) and Engineering - B (materials science). Sponsors will be notified by email of any category changes.
- Category codes are used to identify the categories.
- Projects and investigations may take the form of traditional investigations or may be developed from data sets obtained through various citizen science projects and online databases. Regardless of the ultimate source of the data, papers must be entered into the appropriate category. Projects and investigations may take the form of traditional investigations or may be developed from data sets obtained through various citizen science projects and online databases. Regardless of the ultimate source of the data, papers must be entered into the appropriate category.

A. MIDDLE SCHOOL CATEGORIES

- **For Grades 7 and 8** (Grades 9-12 are not eligible to enter these categories.)
- **Category codes are two letters.** (All MS papers must have a two-letter category code.)

1. **ANIMAL & HUMAN SCIENCES (AH)** – The study of all animals and animal life (including humans), and the study of diagnosing, treating and preventing disease. This includes the studies of cells, cell processes and genetics as they pertain to animals (including humans). This also includes the study of the behavior of animals. It does not include the study of human behavior (see #5).

2. **CHEMICAL SCIENCE (CS)** – The study of matter, its properties and the changes it undergoes.

3. **ECOLOGY & EARTH SCIENCES (EE)** – The study of the interactions among living and/or non-living components of the environment or the study of the Earth including...
geology, oceanography, meteorology, and human impacts. This category does not include astronomy (see #7).

4. **ENGINEERING & TECHNOLOGY (ET)** – The application of scientific, mathematical, and/or engineering principles to achieve a practical result that is of value to human beings and society such as the design, construction, and/or operation of physical, biological, environmental, or computer-based systems. This includes projects focusing on the relation between the structure and properties of materials. Place computer science projects here if they involve a) design of new hardware or software, b) testing of the effectiveness of new hardware or software.

5. **HUMAN BEHAVIOR (HB)** – The study of all aspects of the learning and behavior of humans. Projects involving human subjects must have a copy of the appropriate informed consent form in the Materials and Methods section of the paper (see sections IV, V, and VI for further information). ALL middle school and high school students, regardless of age, need a parental signature on the informed consent form. Only individuals 18 and older who are no longer high school students can sign the informed consent form without having a parental signature.

6. **MATHEMATICS: PATTERNS & RELATIONSHIPS (MP)** – The study of problems in theoretical (abstract math), applied mathematics (modeling), or the use of graphical displays, statistics and/or algebra to review, analyze, and draw conclusions from large databases in non-scientific fields, such as business, humanities, government, manufacturing, sports, etc. Projects involving scientific databases should be entered in the appropriate discipline. Place computer science projects here if they involve different mathematical approaches for solving a problem, e.g. generation of random numbers.

7. **PHYSICAL SCIENCE & ASTRONOMY (PA)** – The study of nonliving matter and energy and their interaction, either on Earth or throughout the universe. This includes astronomy which is the study of the science of the solar system, stars, galaxies, other heavenly bodies, and space exploration (manned and unmanned). This category does not include chemical science (see #2).

8. **PLANT SCIENCES & MICROBIOLOGY (PM)** – The study of plants and plant life and the study of microorganisms. This includes the studies of cells, cellular processes, and genetics as they pertain to plants or microorganisms.

9. **NEW CATEGORY Team Projects (TP)** – The study of a life science, earth science, physical science, engineering and technology, or mathematical topic by a team of no more than four students. The team project may focus on one of the listed topics or integrate various topics.

**B. HIGH SCHOOL CATEGORIES**

- **For Grades 9, 10, 11 and 12** (Grades 7-8 are not eligible to enter these categories.)

14

[Return to Table of Contents]
- Category codes are three letters. (All HS papers must have a three-letter category code.)

9. BOTANY (BOT) – The study of plants, plant cells, and plant genetics. This does not include the study of microorganisms, cellular processes, or biochemistry (see #15).

10. CHEMISTRY (CHM) – The study of the composition, structure, properties, and reactions of matter, especially of atomic and molecular systems. This does not include biochemistry (see #15).

11. ENGINEERING (EGR) – The application of scientific, mathematical, and engineering principles to the design, construction, and/or operation of efficient and economical physical, biological, environmental, or computer-based systems. This includes projects focusing on the relation between the structure and properties of materials. Place computer science projects here if they involve a) design of new hardware or software, b) testing of the effectiveness of new hardware or software.

12. ENVIRONMENTAL & EARTH SCIENCE (ENV) – The study of the biosphere, geosphere, hydrosphere, and atmosphere; this includes interactions within and/or among these components as well as the impact of humans. Archaeology and paleontology projects are included in this category. Astronomy projects are not included (see #16).

13. MATHEMATICS: THEORETICAL & MODELING (MTM) - The study of problems in theoretical (abstract) mathematics or in applied mathematics (use of mathematical models to solve real-world problems). Place computer science projects here if they involve different mathematical approaches for solving a problem, e.g. generation of random numbers.

14. MEDICINE & HEALTH (MDH) – The study of the various sciences related to structure, function, and diseases of humans and laboratory animals.

15. MICROBIOLOGY & CELL BIOLOGY (MCB) – The study of microorganisms and their genetics (bacteria, protozoans, protists, algae, and fungi), cellular processes, and biochemistry.

16. PHYSICS & ASTRONOMY (PHY) – The study of inanimate matter and energy relationships exclusive of chemical change. This category includes astronomy which is the study of the science of the solar system, stars, galaxies, and space exploration (manned and unmanned). This category does not include chemistry (see #10).

17. PSYCHOLOGY (PSY) – The study of all aspects of human thought processes and behavior. Projects involving human subjects must have a copy of the appropriate informed consent form in the Materials and Methods section of the paper (see sections IV, V, and VI for further information). ALL middle school and high school students, regardless of age, need a parental signature on the informed consent form. Only
individuals 18 and older who are no longer high school students can sign the informed consent form without having a parental signature.

18. STATISTICAL ANALYSIS & INFERENCES (SAI) – The use of descriptive and inferential statistics to draw conclusions from databases in non-scientific fields, such as business, humanities, government, manufacturing, sports, etc. Projects involving scientific databases should be entered in the appropriate discipline.

19. ZOOLOGY (ZOO) – The study of vertebrate or invertebrate animals, animal behavior, and animal genetics. This does not include the study of microorganisms, cellular processes or biochemistry (see #15). This category does not include human behavior (see #17).

IV. CONDUCTING THE RESEARCH

A. ETHICS AND INDIVIDUALITY OF WORK

Ethics. Through the annual Research Symposium, the VJAS promotes scientific research at the highest ethical level. The work presented by students must be their own and must not include such things as plagiarism, fabrication of data, and presenting someone else’s work as his/her own. Credit must always be given to information belonging to another researcher.

Multiple Authored Projects. The VJAS requires each participant to work independently unless engaged in a joint project with no more than three additional participants. If a multiple-authored paper is accepted for presentation, all authors must attend the Symposium and participate in the oral presentation.

Sponsors and Mentors.
The “Student Sponsor” (i.e., a teacher at the student’s school) is the student’s official advisor for the research project and research paper and is required to sign the Student Entry Form for the research paper via electronic signature (as well as any other forms that must be submitted). Other teachers at the student’s school, parents, faculty at colleges and universities, and industrial researchers, among others, may serve as advisors, consultants, or supervisors provided that the student conducts and understands his/her research.

Any student who worked in a research facility or received significant help from a professional other than his/her teacher (Student Sponsor), must complete and submit the Mentor and/or Research Facility Form. This includes working in a laboratory or receiving significant help from a parent or family friend. The student enters the name and email of their mentor. The mentor will be sent the form to complete and then to submit on Reviewr. The student submission will not be complete until the Mentor and/or Research Facility Form is submitted by the student mentor on Reviewr.
B. PLANNING AND DESIGNING THE RESEARCH

1. Early **planning** is important. A research plan/proposal of the anticipated project should be submitted to the student sponsor (advisor) for review. Such a review of the **problem to be studied** ultimately saves time, effort, and money and results in a better investigation.

2. When the problem to be studied has been identified, **researching** background information and the works of others facilitates focusing on a general topic to a definite **hypothesis**.

3. Careful **research design** utilizing experimental controls, identification of variables, analysis of data, and creativity are considered fundamental to a successful research project.

4. A **simple experiment** using readily available materials in an ingenious fashion may indicate higher capabilities than a complex subject which is neither well designed nor understood. On the other hand, certain research must be in compliance with designated **regulations** and an electronically signed **Certification Statement** must be completed on Reviewr at the time of paper submission, when vertebrate animals, human subjects, recombinant DNA, cells and tissues, and pathogenic agents, toxic or controlled substances, etc. are involved in the research. (See “Regulations and Certifications” in Section V.)

5. Projects and investigations may take the form of traditional investigations or may be developed from data sets obtained through various citizen science projects and online databases.

C. SAFETY AND RECORD KEEPING

1. Appropriate **safety** guidelines must always be part of your research plan, followed carefully, and documented in your records and research paper. At any time that the director deems the presentation of a paper exposes the VJAS to liability due to improper supervision, safety protocols, and/or the breaking of state or federal law during the project, the director may remove the paper from being presented at the symposium.

2. Discuss your research plan with your **Student Sponsor** (advisor), and mentor, if applicable. After approval of the research plan and experimental design, the researcher may then proceed with experimentation.

3. A **written record** is an important part of every research investigation, including the safety precautions followed. Each aspect of the experimental design should be recorded, including all collected data, observations, and experimental notes.
4. Safety precautions must be clearly described and discussed in the Materials and Methods. For instance include statements such as:
   a. To prevent eye and skin damage when dealing with acid, chemical splash goggles and a lab apron were worn.
   b. Due to the fumes given off, the reaction was carried out in a fume hood.

These are just a couple of examples of safety statements that should be included in the Materials and Methods.

D. FINANCIAL SUPPORT

Some financial support for research is available through the VJAS office. Funds are provided from the proceeds of the Phil Robinson Virginia Naturally 5K Run held in previous years. These monies will NOT cover travel expenses OR materials schools normally have. Upon completion of the research, these materials become the property of the school. Grants usually do not exceed $100.00. Each student applying for support must complete the Research Grant Application and submit it and any supporting information to the VJAS Director by November 1.

Notification of awards and checks are sent directly to the sponsor within three weeks. When a student requests funds, it is a commitment to submit a paper, and attend and present at the Symposium if selected. If these conditions are not met, this is a violation of the fund and monies must be returned to the Phil Robinson Research Fund.

V. REGULATIONS AND CERTIFICATIONS FOR RESEARCH

Certain types of research require that special and designated regulations be followed. In these cases, a “Certification Statement” must be signed by the student and the sponsor verifying that the regulations have been followed.

- When a student does research in any of these areas, the regulations below must be followed, and both the student and sponsor must check the appropriate statements on the Certification section in Reviewr.
- The Certification Statement section must be completed for ALL types of projects.

A. VERTEBRATE ANIMAL EXPERIMENTS

The basic aim of experiments involving vertebrate animals is to achieve an understanding of life’s processes. Experiments involving vertebrate animals must have clearly defined objectives requiring the use of animals to demonstrate a biological principle or answer scientific propositions. Protista and other invertebrates are preferable for most experiments involving animals. The wide variety of these animals and the feasibility of using large numbers make them especially suitable.

Federal, State, and VJAS regulations concerning animal research apply to ALL vertebrates under ANY conditions.
1. Animal experiments must be conducted with respect for life and an appreciation for humane considerations. To provide for the humane treatment of vertebrate animals, a qualified adult supervisor who has had training in the proper care of vertebrates must assume the primary responsibility for the conditions of an experiment that involves living vertebrates. If the school faculty includes no one with training in the proper care of vertebrates, the services of such a person must be obtained. All animals, whether laboratory, domestic, or wild must be maintained in suitable environmental conditions for that species.

2. No experiments may be undertaken that involves anesthetics, drugs, thermal procedures, organisms pathogenic to vertebrates, ionizing radiation, carcinogens, or surgical procedures other than venipuncture or hypodermic injection unless the procedures are performed under the immediate supervision of a Qualified Scientist experienced in the field under investigation or a Designated Adult Supervisor in an institutional laboratory. In addition to the qualified scientist, a designated adult supervisor will be required when the research is not conducted in the qualified scientist’s laboratory. Note: This is different from the sponsor.

3. The comfort of the animals used in an experiment shall be a prime concern. No experiment using live vertebrate animals shall be attempted unless the animals have been obtained from a reliable source and the following conditions can be assured:
   - Continuous care, including weekends and vacation periods;
   - Appropriate, comfortable quarters;
   - Adequate food and water;
   - Humane treatment and gentle handling.

4. Research in nutritional deficiency, ingestion or inoculation of hazardous or reputedly toxic materials or drugs may proceed only to the point where symptoms of the deficiency or toxicity appear. Appropriate measures shall then be taken to correct the deficiency, toxicity, or drug effect if such action is feasible, or the animal(s) shall be killed by a humane method by the animal care supervisor. Students are not to euthanize animals.

5. LD₃₀ and beyond experiments are unacceptable and will not be permitted. The LD₃₀ (lethal dose or death rate) will be calculated for the total experiment and for each subgroup in the experiment such as the control and various experimental groups. LD₃₀ in the total or any subgroup will not be permitted.

6. Research that is designed to kill vertebrates for any reason will not be permitted. Proper euthanasia for pathological analysis is the only exception to this rule and this is conducted by an animal care supervisor only. An animal care supervisor only must conduct this research.

7. To assure proper technique, surgical procedures on vertebrates shall only be done within an academic, hospital, and clinical or institutional research facilities under direct adult
supervision. This rule is intended specifically to prohibit such procedures at home.

8. The student shall not be allowed to perform sacrifice unless under the supervision and in the presence of the animal care supervisor, qualified scientist, and/or the designated adult supervisor. The only exception to this rule is an emergency, which would require a humane termination of life.

9. Each student who submits a research paper to the Junior Academy, and uses live vertebrates in that research is required to complete the “Certification Statement” found in Reviewr:

“I certify that the use of live vertebrates in the experimentation and observations covered by this paper was in accordance with the rules for the use of live vertebrates contained in the latest edition of the VJAS handbook.”

If this applies, both student and student sponsor must electronically sign the appropriate certification statement on the Reviewr platform during the paper submission.

B. HUMAN SUBJECT RESEARCH

The decision to undertake research using human subjects should rest upon valid contributions to psychological science and human welfare. The investigator must carry out investigations with respect to the research subjects’ dignity and welfare. Consent of subjects’ participation MUST be obtained anytime there is interaction with the human subjects or anytime the environment is altered in the study of the human subjects. All projects require IRB (Institutional Review Board) approval.

If the subject is under 18, parental permission must be obtained. ALL middle school and high school students, regardless of age, need a parental signature on the informed consent form. Only individuals 18 and older who are no longer high school students can sign the informed consent form without having a parental signature. The following principles describe the investigator’s ethical responsibilities:

1. IRB (institutional review board) approval (or equivalent) for all human subject projects is required. Signatures of IRB members who approved the project must be included on the informed-consent letter. Projects that would not normally require informed consent should generate an informed-consent letter to use for IRB Signatures and have a copy of this in the Materials and Methods section of the paper.

2. The rights of the participants must be protected at all times. If the study deviates from any ethical principle, the investigator must seek ethical advice and redesign the research to protect the rights of the participants.

3. All individuals involved (main researcher, collaborators, etc.) in research projects dealing with human subjects are responsible for maintaining the rights of the participants involved.
4. Prior to the commencement of the research and using language that is reasonably understandable to the participants, the investigator must inform all participants of the nature of the research and that they are free to participate or to decline or to withdraw from the research at any time without penalty or retribution. Such informed consent must be appropriately documented on a written Consent Form (designed by the researcher) and must include:

   a. Signatures of IRB members who approved the project.
   
   b. All negative or positive aspects of participation. “None” is not an appropriate response for negative aspects. There is always something that could impact another person in unknown ways.
   
   c. The investigator must agree to answer all of the questions posed by the participants.
   
   d. If concealment or deception is an integral feature of the design and conduct of the research, this must be explained to the participants as early as is feasible. (The use of concealment or deception is only justified if no equally effective alternative procedures are available.) The investigator must honor all promises and commitments included in the agreement.

**Note:** A sample of the Consent Form provided to participants and/or their parents must be included in the Materials and Methods section of the submitted VJAS Research Paper. It is satisfactory to insert an image of the informed consent form into the materials and methods. A full-page for the sample informed consent form need not be used. ALL middle school and high school students, regardless of age, need a parental signature on the informed consent form. Only individuals 18 and older who are no longer high school students can sign the informed consent form without having a parental signature.

5. The investigator must protect participants from any present or future physical and mental discomfort, harm, and danger. This includes following proper social and physical distancing regulations imposed by local or state authorities and appropriate use and discard of PPE (personal protective equipment).

6. After the data are collected, the investigator must provide the participants with an explanation of the study and remove any misconceptions that may have arisen. Where scientific or humane values justify delaying or withholding information, the investigator acquires a special responsibility to assure that there are no damaging consequences for the participants.

7. Information obtained about research participants during the course of an investigation is confidential. If others may obtain access to such information, this possibility, and plans for protecting the confidentiality of participants, must be explained to the participants.
NOTE: These guidelines were adapted from the *Ethical Principles of Psychologists and Code of Conduct, 1995.*

When doing research involving only observations of the behavior of human subjects in their unmodified environment and no information is obtained that identifies individuals, consent is not required.

8. Each student who submits a research paper to the Junior Academy, and who used human subjects in that research is required to furnish the following certification with all copies of the paper, using the “Certification Statement” found in Reviewr:

“\[I\] certify that the use of human subjects in experimentation and observations covered by this paper was in accordance with the State of Virginia *Regulations of the Board of Education Regarding Research Involving Students* and the rules for the use of humans contained in the latest edition of the VJAS Handbook.\]”

If this applies, both student and student sponsor must electronically sign the appropriate certification statement on the Reviewr platform during the paper submission.

C. RECOMBINANT DNA RESEARCH REGULATIONS

Recognizing both the risks and benefits inherent in recombinant DNA research, VJAS has adopted a set of rules to govern student research employing these techniques. All research must be carried out in accordance with the revised *NIH Guidelines for Research Involving Recombinant DNA Molecules* (2011). To obtain a copy of this document, visit [http://oba.od.nih.gov/oba/rac/guidelines/nih_guidelines.htm](http://oba.od.nih.gov/oba/rac/guidelines/nih_guidelines.htm).

1. All research involving recombinant DNA technology must be carried out in accordance with the revised *NIH Guidelines for Research involving Recombinant DNA Molecules*.

2. Only research that is normally conducted in a microbiological laboratory without containment will be permitted and only when under the supervision of an appropriately Qualified Scientist. Research requiring containment is prohibited.

3. Each student who submits a research paper to the Junior Academy involving recombinant DNA is required to furnish the following certification with all copies of the paper, using the “Certification Statement” found in Reviewr:

“\[I\] certify that the use of recombinant DNA in the experimentation and observations covered by this paper was in accordance with the revised *NIH Guidelines for Research Involving Recombinant DNA Molecules* and the rules contained in the latest edition of the VJAS Handbook.\]”

If this applies, both student and student sponsor must electronically sign the appropriate certification statement on the Reviewr platform during the paper submission.
D. CELL AND TISSUE RESEARCH

1. Tissue samples such as blood, blood products, teeth, cell cultures, or body fluids of human or vertebrate animals must be obtained from an institution or biomedical scientist. Plant tissue is excluded.

2. Human blood and blood products must be documented as free of AIDS and hepatitis prior to the student receiving the tissue.

3. Each student who submits a research paper to the Junior Academy which involves the use of cell or tissue research must furnish the following certification with all copies of the paper, using the “Certification Statement” found in Reviewr:

“I certify that the use of cell or tissue samples in the experimentation and observations covered by this paper was in accordance with the rules contained in the latest edition of the VJAS Handbook.”

If this applies, both student and student sponsor must electronically sign the appropriate certification statement on the Reviewr platform during the paper submission.

E. PATHOGENIC AGENTS, TOXIC OR CONTROLLED SUBSTANCES

1. Projects involving E-coli k-12 do not require a pathogenic organism certification statement. These projects must clearly state the complete bacteria strain in the materials and methods (E-coli k-12). Failure to do this will result in the disqualification of the project.

2. Reactions and processes that use non-toxic reactants but produce toxic products or fumes should be treated as toxic substances and the appropriate safety precautions and certification statements are to be used.

3. No research may be undertaken with pathogenic agents, toxic or controlled substances unless these procedures are performed under the direct supervision of a Qualified Scientist or Designated Adult Supervisor in an institutional laboratory. Agents obtained from unregistered sources, such as public surfaces, food, soil, etc. are to be considered potentially pathogenic and fall under these guidelines. In addition to the qualified scientist, a designated adult supervisor will be required when the research is not conducted in the qualified scientist’s laboratory.

   Please note, we automatically disqualify any projects pertaining to mold or mildew, even if an experiment is discarded at the first sight of mold growth.

4. Each student who submits a research paper to the Junior Academy and used pathogenic agents, toxic or controlled substances in that research is required to furnish the following certification with all copies of the paper, using the “Certification Statement” found in...
Reviewr:

“I certify that the use of pathogenic agents, toxic or controlled substances in the experimentation and observation covered by this paper was in accordance with the rules for pathogenic agents, toxic or controlled substances contained in the latest edition of the VJAS Handbook.”

If this applies, both student and student sponsor must electronically sign the appropriate certification statement on the Reviewr platform during the paper submission.

F. MENTORED RESEARCH and/or RESEARCH CONDUCTED in a RESEARCH INSTITUTION

1. The writer must give credit for special assistance received from scientists or other sources on the VJAS Mentor and/or Research Facility Form. Please note that this may be a parent or close friend with expertise. This can include bench work.

Any student who worked in a research facility or received significant help from a professional other than his/her teacher (Student Sponsor), must submit the Mentor and/or Research Facility Form. This includes working in a laboratory or receiving significant help from a parent or family friend. This form is completed on Reviewr at the time of paper submission. The student submission will not be complete until the Mentor and/or Research Facility Form is submitted by the student mentor on Reviewr.

If this applies, the mentor or research facility director must complete and sign this form on Reviewr.

2. Each student who submits a research paper to the Junior Academy and used a mentor and/or worked in a Research Facility is required to furnish the following certification using the “Certification Statement” form on the Reviewr platform:

“This is to certify that the student worked in a research facility and/or received significant help from a professional scientist/mentor other than the teacher serving as the Student Sponsor.”

If this applies, both student and student sponsor must electronically sign the appropriate certification statement on the Reviewr platform during the paper submission.

VI. PREPARATION AND PRESENTATION OF PAPERS

A. WRITING THE PAPER

NOTE: Papers not following these guidelines will be disqualified.

NOTE: Papers not following these guidelines will be disqualified.

1. LENGTH.
a. Fourteen-page total limit.
   i. The text (Abstract, Introduction, Methods and Materials, Results, Discussion, Conclusion, Literature Cited, Appendix (optional)) should be fourteen (14) pages, 8 1/2" by 11" (21.3 cm by 27.5 cm) paper formatting. Raw data is not necessary as only average data should be presented. Any data, pictures, diagrams, etc. important to the paper should be included in the body of the paper.
   ii. Papers should be formatted with line spacing set no less than 1.5 and no greater than 2.0.
   iii. Sections of the paper should immediately follow one another rather than starting on a separate page.
   iv. The results section includes summary data (charts/graphs and illustrations) and the analysis of the data.

2. FORMAT.
   a) Font. Use a word processor, 12 pt. font size (no smaller) in one of the following print fonts - Arial, Helvetica, Times New Roman, Courier, or Geneva. Others will not be accepted. Do not change the font size or style in the body of the paper. Graphs and charts may be in a different but legible format.
   b) Line spacing. Papers should be formatted with line spacing set no less than 1.5 and no greater than 2.0.
   c) Margins shall be not less than 1" (2.5 cm) on the top, bottom, and left and right margins of all pages INCLUDING appendices. All copies must be dark enough to photocopy.
   d) Number the pages with the Abstract as page 1. The page numbers should be placed in the footer and can be within the 1” margin.
   e) Headings (Abstract, Introduction, Methods and Materials, etc.) should be bolded and/or underlined.

3. LITERATURE CITATIONS. (Also see B. 6.)
   a) In-Text Citations. All references must be properly cited in the paper. Give the author’s last name and year in parentheses (Wagner, 1988) for in-text citations (use et al. if more than two authors) but do not use et al. in the Literature Cited part of the paper (all authors names must be included). Footnotes are NOT used in scientific papers for citation.
   b) When information belongs to others, proper credit must be given to the author. Failure to do so is plagiarism. Students should be informed that if they copy from an author word for word without attempting to rephrase sentences in their own words, they must put the copied material in quotation marks or otherwise set it off from the rest of the text, such as by indenting and single spacing it. Even if the author is cited, any material taken word for word must be credited to the author by putting it in quotes. Plagiarism will result in disqualification.
4. **MECHANICS OF THE PAPER.** The paper should be concise and proper grammar, sentence structure, and punctuation should be used throughout the paper. In most scientific disciplines papers have traditionally been written in the third person but, more recently, the first person has also been used. The results of the study should be written in the past tense while accepted facts may be written in the present tense. In contrast, papers in the areas of mathematics, statistics, and computer science are written in first person present tense. Graphs and figures not done by a computer should be appropriately labeled in black ink, suitable for publication. After the paper has been edited and rewritten by the student, it should be submitted to a science teacher for review and suggestions. In addition, the papers should be reviewed by an English teacher and/or consulting scientist. **Note. Do not submit papers that include the school’s web address in the margins. Do not include any other personally identifiable information such as pictures of scientists, authors, or experiment subjects.**

B. **THE PAPER COMPONENTS**

(The following are the required headings, and should be **bolded** and/or **underlined**, both of which are shown below. Number the pages beginning with the abstract as page 1.)

1. **ABSTRACT.** The abstract consists of concise statements of the research objective, approach, key results, and conclusions. It must not exceed one (1) standard page. **Do not use citations in the abstract or refer to any other part of the paper. The fourteen (14) allowable text pages begin with this page.**

2. **INTRODUCTION.** The introduction includes a brief review of current and related literature with an explanation of the writer’s interest in the subject. Additionally, it should contain the problem, concise objectives, identification of variables, and the hypothesis.

3. **METHODS AND MATERIALS.** This section explains the equipment and supplies used, the methods employed and safety guidelines followed in the research. The materials used should be incorporated in the description of the procedures rather than in list format. All procedures, written in paragraph form, should be sufficiently detailed and clearly stated to allow duplication of the experiment. Standard techniques, appropriately referenced, may be included without providing details. Specialized techniques should be presented concisely. A description of equipment unique to the experiment or which was built specifically for use in this research should be included. The number of organisms (sample size), experimental replications, and/or type of statistical analysis should be included. The description of the experimental design should be in text form. Pictures/photographs and/or diagrams relating to your procedure are encouraged and should be included here. A copy of the informed consent form should be included in this section. An image of the informed consent is sufficient. It is not necessary for the image of the informed consent form to take up a whole page.
Proper safety protocols that were used to minimize risks must be clearly stated and described. These statements may sound like the following:

To prevent eye and skin damage when dealing with acid, chemical splash goggles and a lab apron were worn.
Due to the fumes given off, the reaction was carried out in a fume hood.

2. **RESULTS.** This section contains only information obtained as a result of the investigation or experimentation. It consists of both data presentation and data analysis.

   a. **Data Presentation.** Only summary data should be presented. (Raw data, if vital to the paper, should be placed in an appendix.) Summary data should consist of both:
      i. Numerical data (charts or tables) and/or pictorial data (graphs, pictures, and/or photographs) which are appropriately titled and have the variables clearly labeled;
      ii. Verbal synopsis (paragraphs) of findings with clear references to applicable charts, tables, and/or graphs.

   b. **Data Analysis.** The data presented should be evaluated for general trends and the degree of variability. Appropriate use of methods of analysis of these data should be presented and explained, such as measures of central tendency, measures of dispersion/variation and/or other statistical analysis.

3. **DISCUSSION AND CONCLUSIONS.** This section contains an interpretation of the results. Comparisons to other research should be made with appropriate literature citations. An evaluation of the success of the experiment, possible procedural improvements, and suggestions for future scientific studies may also be included. Logic and the application of laws, principles, and theories are used to draw conclusions. The conclusions should be clearly and concisely stated and the hypothesis either accepted or rejected.

4. **LITERATURE CITED.** This is NOT a bibliography. This section is a list of all books, publications, and communications from which significant materials were cited in the paper. **IF this is not done or if the section is named improperly, then the paper will be disqualified.**

   a. Reference Requirements.
      i. Middle school papers must include a minimum of three peer-reviewed or scholarly references.
      ii. High school papers must include a minimum of five peer-reviewed or scholarly references.
      iii. Each reference must be cited at least once in the paper.

b. Types of References.
   ■ Peer-reviewed or Scholarly. These are references written for an audience of scholars and researchers in a particular field and are published in “scholarly” publications. Other terms commonly used to describe this type of journal are peer-reviewed, academic, or refereed. Peer review is a
process used to ensure the quality of articles. When an article is submitted to a peer-reviewed journal, the editor(s) send it out to experts/scholars in the field (i.e. the author’s peers) to review and critically evaluate the article on quality, importance, and appropriateness to the journal. Most peer-reviewed articles present primary, or new, research. The VJAS also encourages the use of secondary research, which it considers as “scholarly.” While it does not present new research it does provide a compilation or evaluation of previously presented material which can be very helpful to student researchers, particularly those doing research for the first time. Examples include:

- Scientific articles summarizing research or data, such as in *Scientific American, Discover, Annual Review of Genetics*, or *Biological Reviews*,
- Encyclopedia entries and entries in most other Reference books,
- Textbooks.
- Website sources can be peer-reviewed and scholarly.

**Non-peer-reviewed** (non-scholarly). Many website “sources” such as, magazine articles, are only judged/reviewed by the editor/writer of the source/magazine, who may not have any knowledge of the article's subject matter. Writers for popular publications are usually paid for their articles. The articles are also usually geared to a more general audience.

**Notes.**

- If you are not sure whether an article is peer-reviewed or scholarly or not, please check with someone who might know or who could check on this, such as a librarian.
- Wikipedia references are unacceptable.
- For more information, see [http://www.linfo.org/peer_review.html](http://www.linfo.org/peer_review.html), [http://www.library.tcu.edu/howto/primary.asp#scholarly](http://www.library.tcu.edu/howto/primary.asp#scholarly), [https://www.saintmarys.edu/library/how-do-i-decide-if-source-scholarly](https://www.saintmarys.edu/library/how-do-i-decide-if-source-scholarly).

c. Format and Style.

i. The citations are to be listed (divided) into two sections: Peer-reviewed and non-peer-reviewed. See the example below.

ii. Middle school papers (grades 7-8) will be accepted in both MLA and APA citation formats. However, we will only accept APA citation format for high school papers (grades 9-12). Also, see [www.citationmachine.net](http://www.citationmachine.net).

iii. The list is alphabetical by the last name of the first author of a citation.

iv. Use single spacing within each listing and 1.5-2.0 spacing between the listings. See the example below.

d. Literature Cited is the last component of the paper (occurring on page 14 or before).
**Examples of Literature Cited:** (Notice separate sections and use of spacing.)

**Peer-reviewed and Scholarly references**


**Non-peer-reviewed references**


5. **APPENDIX (optional).** If included, this section should be limited in length. The appendix may include extra photographs, explanations of formulas, code for specialized computer programs, etc. Raw data should not be submitted with the paper. The fourteen (14) page limit includes the appendix.

**NOTES:** Do not include a Title Page. Do not include Acknowledgements.

**C. Entry Fees.** The appropriate entry fee must be paid online via Reviewr at the time of submission. If paying by P.O. or check the P.O. # or check # need to be entered in the payment information in Reviewr. S Office.

**E. PAPER PROCESSING**

- **Upon Submission in Reviewr**

  Immediately following the March 2, 2022 paper submission deadline, sponsors will have until March 9, 2022 to review and verify their students’ submissions. During this period students with completed submissions will be able to edit mistakes uncovered by their sponsor.

  Following March 9, 2022, a group including the Director, staff, and Committee members screens the papers in accordance with the DISQUALIFICATION LIST located in the appendix. Students will be notified of the reason their papers were DQ’d in late Spring.

- **Processing and Screening**

  Papers will be distributed to readers for evaluation. The readers’ scores are averaged and ranked. The list of presenters is determined based upon the readers’ ranked scores and

Return to Table of Contents
available spots to be filled in each category. In categories with more than one section, papers will be distributed into sections.

● **Judging**
Each presentation room will typically have one head judge and up to two additional judges. The judges read the papers prior to the Symposium and evaluate the written paper marking the appropriate portion of the Judge’s Evaluation Form before the Research Symposium. The scoring of the oral presentation portion occurs at the Research Symposium. After all of the papers are presented, the judges complete their evaluations, rank their scores and select the winners. Papers are ranked based on the scores from all of the judges with no one judge having greater influence over the final results. *(Note. The judges do not see the Reader’s Evaluation Forms which are only used to determine that they are allowed to present at the Symposium.)* Participants have agreed to abide by the judges’ decisions and to not contest the judges’ results.

● **Returning Papers**
Readers’ comments and judges’ scores will be released via Reviewr after the Symposium concludes.

F. **NOTIFICATION AND SYMPOSIUM PREPARATION**

1. **Notification.** Sponsors of students who submit papers for presentation at the VJAS Research Symposium and students who have submitted independently may begin looking on our website (www.vjas.org) for the list of papers accepted for presentation (late March-early April).

   ● *At this point and until the end of the Symposium, we are not able to answer any questions about specific papers and why they were not accepted.* We take great care in processing the papers submitted to the VJAS for our Research Symposium in May. During the receipt, screening and reading of papers and the preparation of the accepted lists, we check and double-check our work at each step with multiple people. Unfortunately, as in any such competition, we cannot accept all of the entries.

2. **Symposium Information.** At this time information regarding the forthcoming Research Symposium will be made available through our website (www.vjas.org):
   a. Registration information.
   b. Food and lodging information.
   c. General Research Symposium information.

3. **Special Interest Awards.** Application is made by completing the appropriate application on Reviewr after acceptance to the Symposium.

4. **Scholarship Applications.** Application is made by completing the appropriate application on Reviewr after acceptance to the Symposium.
5. **Confirmation of Participation.** Sponsors should *confirm* the participation of all of their accepted students by email with the VAS office and notify the Office of any student(s) that cannot participate by **April 30, 2021.** *(Example: “all of our students will participate, except...”)* The names of the students who cannot participate will not be included in the final version of the program.

**G. PRESENTATION OF THE PAPER**

**Overview.**

In the presentation of the paper, the presenter informs colleagues, judges, and other members of the scientific community of the research done.

The presentation should provide the judges with information that cannot be obtained from reading the paper. Presentations should address the following six questions:

i) Why did you decide on this project topic?

ii) What resources were most helpful in designing your project? Explain.

iii) In designing your project, what constraints were encountered when developing your experimental design? How might you eliminate or minimize these in the future?

iv) Please comment on the strengths and limitations of your project data. Use specific examples from your project to support your answer and make recommendations.

v) What was unexpected during your project? How did you handle it?

vi) What is the most important thing(s) you learned from this project? How can you use this information in the future?

**Presentation Guidelines.**

Presenters will be allowed a period of ten (10) minutes for their presentation. This is followed by a three (3) minute period of questioning by the judges and audience. Two (2) minutes are allowed between presentations for the next speaker to prepare.

**Videotaping in any form (this includes using video conferencing applications like Zoom, Hangouts, etc.) during presentations is not allowed by the participants (or parents, teacher sponsors, etc). Only an official VJAS media member may film during presentations for marketing and promotional purposes (the personnel can be identified by an official VJAS media tag/name badge).**

*By registering to attend the Virginia Junior Academy of Science (VJAS) symposium, you grant permission to VJAS and the host institution to take and use your photo in VJAS and host institution marketing and promotional pieces for an indefinite period of time. Marketing and promotional pieces include, but are not limited to, printed brochures, reports, postcards, flyers, and materials, as well as online uses such as postings on the VJAS and host institution website, online newsletters, and email blasts. VJAS and host institution shall own all rights, including copyrights in and to the photos. You also grant permission to VJAS and host institution to use, encode, digitize, transmit, and display the video/audio of your session, presentation, or workshop given at the VJAS conference, singularly or in conjunction with other recordings, as well as to use your name, photograph, biographic information, and ancillary material in connection with such video/audio for commercial, promotional, advertising, and other business purposes.*
Presentation Format.

Technology. The presentation should be supported by appropriate visual aids, such as a PowerPoint or some LCD/Computer-generated presentation material, on a flash drive. While the host school provides the technology to display these, it is important to check the website for specific notes on what formats are required. In the unusual case of equipment failure, there should be a back-up plan, such as a hard copy of the presentation or laptop computer.

If there are additions to the paper since its submission, these should be included in the presentation. Ancillary materials are not permitted and students will be disqualified. Ancillary materials DO NOT include notecards or project papers.

Preparation.

Adequate preparation for the oral presentation of the student research paper is highly recommended. This preparation should include teachers, other students, and related professionals acting as a critiquing audience for oral practices of the presentation. The student presenter should be critiqued regarding general delivery, speaking voice, clarity, mannerisms, and the use of visual aids as well as on scientific accuracy. An outline of the presentation on note cards may be desirable to help avoid information omission and to stay within the time limitations. You ARE NOT to read your paper. You are to speak so all in the room may hear and understand your words. You should use a pointer when pointing to images on the screen, chalkboard, or overhead projector. Do not use a laser pointer.

Dress.

Students presenting papers should be properly dressed (business casual) for the oral presentation.

The entire oral presentation must be done in person by all of the authors. All multiple authors must attend the meeting and present. If there are extenuating circumstances, such as injury or death in the family, affecting the attendance of one member of a team project, the proposal for having the remaining team present should be submitted before the meeting begins. Please send a request no later than one week prior to the beginning of the meeting to the VJAS Director.

H. ABSTRACT SUBMISSION AND PUBLICATION

- The VJAS publishes Proceedings for each Research Symposium. These are posted online on the VJAS website for download. The abstracts of all presentations will be published as well as a list of the award winners and the entire papers of VJAS Honors Awards winners.

- Abstract Submission. Each person (or group of multiple authors) that presents a paper at the Virginia Junior Academy of Science Research Symposium is required to submit an abstract of his/her paper at the time of paper submission on Reviewr. These abstracts will be used in the VJAS Proceedings.
VII. AWARDS

A. SECTION AWARDS
Description: Certificates are given for the best student research papers presented in competition at the annual VJAS Symposium. Certificates for First, Second, Third, and up to three (3) Honorable Mention Places may be awarded in each of the following categories.

Categories:

Middle School (Grades 7 and 8)  High School (Grades 9 – 12)
Animal & Human Sciences  Botany
Chemical Science  Chemistry
Ecology & Earth Sciences  Engineering
Engineering & Technology  Environmental & Earth Science
Human Behavior  Mathematics: Theoretical & Modeling
Mathematics: Patterns & Relationships  Medicine & Health
Physical Science & Astronomy  Microbiology & Cell Biology
Plant Science & Microbiology  Physics & Astronomy
Team Projects  Psychology

When there are multiple sections in a category, awards will be given in each category section.

Procedures: Papers chosen for presentation will be judged in the sections of each category by the section judges. These judges will evaluate both the research paper and the oral presentation of the research at the research symposium for the final selection of First, Second, Third, and Honorable Mention winners. The decision of these judges is final. Please note that students/teachers/sponsors/parents or anyone else may not contact the judges prior, during, and after the Research Symposium or disqualification will occur.

Criteria: The criteria for these awards appear as the points considered by the judges on the Judge’s Evaluation Form.

B. BEST OF CATEGORY AWARDS
These awards are given to the best project in certain categories. If there are multiple sections, the VJAS Chair and/or the VJAS Director has the right to decide whether a) the two (or more) section judges meet together and decide one final project for the Best of Category Award OR b) receive all first place papers from sections and let the Honor Awards Committee/Judges decide the winning project for the Best of Category Award.

VAS BOTANY AWARD
Description: Given by the Botany Section of the VAS for outstanding research presented in a Botany section of the VJAS.
Procedure: The section judges of Botany will select the best Botany paper to receive this award.
RODNEY C. BERRY CHEMISTRY AWARD
Description: Given for outstanding research in the field of chemistry.
Procedure: The section judges of Chemistry will select the best Chemistry paper to receive this award.

WILLIAM W. BERRY ENGINEERING AWARD
Description: A certificate is given to the best paper in the field of Engineering. Dominion Virginia Power established the award in honor of retired Virginia Power Chairman, W. W. Berry.
Procedure: The section judges of Engineering will select the best Engineering paper to receive this award.

ANN M. HANCOCK CELLULAR BIOLOGY AWARD
Description: Given to the best paper in cellular biology. This award is given in memory of Ann Hancock who retired from the Hanover County Public Schools.
Procedure: The section judges of Microbiology and Cell Biology will select the best Cellular Biology paper to receive this award.

MATHEMATICS AWARD
Description: Given for outstanding research in mathematics.
Procedure: The section judges of Mathematics: Theoretical & Modeling will select the best Mathematics paper to receive this award.

STATISTICS AWARD
Description: Given for outstanding research in statistics.
Procedure: The section judges of Statistical Analysis & Inferences will select the best Statistics paper to receive this award.

VABE ZOOLOGY AWARD
Description: Given for outstanding research in Zoology. The Virginia Association of Biological Educators supports this award.
Procedure: The section judges of Zoology will select the best Zoology paper to receive this award.

C. SPECIAL INTEREST AWARDS
Special Interest Awards must be applied for in advance of the VJAS Research Symposium. Only papers accepted for presentation are eligible, so students must wait until notified of acceptance before applying. Application is made by submitting a Special Interest Award form available on the Reviewr platform after acceptance to the Symposium. Follow the instructions on the form and those below carefully.

Note: If no qualified papers meeting the standards of the award(s) are received, it (they) will not be given.
Directions for submitting Special Interest Award applications:

- Application is made by submitting a Special Interest Award form available on the Reviewr platform after acceptance to the Symposium. Applications must be received by April 30.

A student must present his/her paper at the meeting to be eligible for these Special Interest Awards. There is no appeal process for these decisions.

**ROSCOE HUGHES GENETICS AWARD**

**Description:** Given to an outstanding paper in the field of Genetics. It is given in memory of Dr. Roscoe D. Hughes who formed the “Department of Biology and Genetics” in 1938 in the Medical College of Virginia’s School of Pharmacy, later to become part of VCU. In the 1960s the Virginia Academy of Sciences, led by Dr. Hughes, vigorously lobbied the Governor and the General Assembly to finally establish the Science Museum of Virginia.

**Procedure:** The selection of the winning papers is made by the Roscoe Hughes Genetics Award judges based on the written paper.

**CANCER RESEARCH AWARDS**

**Description:** Given by the American Cancer Society for outstanding research relevant to cancer studies based on the written paper.

**Procedure:** Selection of the winning papers is made by the Cancer Research Award judges based on the written paper.

**DR. AND MRS. PRESTON H. LEAKE AWARD IN APPLIED CHEMISTRY**

**Description:** Given to the paper that shows in some way how chemicals, chemical principles, or chemistry have been used, or might be used to enhance or even save lives - ways chemistry may be used to provide better things for better living.

**Procedure:** The selection of the winning paper is made by the Dr. and Mrs. Preston H. Leake Award in Applied Chemistry judges based on the written paper.

**SMITH SHADOMY INFECTIOUS DISEASES AWARD**

**Description:** Given to commemorate Dr. Smith Shadomy by the Virginia Chapter of the National Foundation for Infectious Diseases to the paper that evidences outstanding research in the field of infectious diseases.

**Procedure:** The selection of the winning paper is made by the Infectious Disease Award judges based on the written paper.

**SPELEOLOGICAL SOCIETY AWARD**

**Description:** Given by the Richmond Area Speleological Society for outstanding research addressing karst or topics related to speleology (bats, caves, carbonate geology, paleoenvironments, limestone fossils, sinkholes, etc.).

**Procedure:** The selection of the winning paper is made by the Speleology Society Award judges based on the written paper.

**VIRGINIA MUSEUM OF NATURAL HISTORY (VMNH) AWARD**
**Description:** Presented by VMNH in recognition of significant contributions in the study and interpretation of Virginia’s natural heritage.

**Procedures:** The selection of the winning paper is made by a representative of the Friends of the VMNH based on the written paper.

**VIRGINIA SEA GRANT COLLEGE PROGRAM AWARD**

**Description:** Given by the Virginia Sea Grant College Program for outstanding marine or coastal research.

**Procedure:** The selection of the winning paper is made by the Virginia Sea Grant College Program Award judges based on the written paper.

**GAMMA SIGMA DELTA AWARD**

*Virginia Tech Chapter of the Honor Society of Agriculture*

**Description:** Given to a student in recognition of excellence in research dealing with the application of new technologies and/or concepts in agriculture, forestry, or veterinary medicine.

**Procedure:** The selection of the winning paper is made by the Gamma Sigma Delta Award judges based on the written paper.

**D. VJAS HONOR AWARDS**

These are the highest awards that the Virginia Junior Academy of Science presents. Special panels of honor judges evaluate the projects and determine the awards. Criteria for selection include:

- Uses accepted practices and reporting procedures for the sciences, mathematics or engineering/technology;
- Addresses a valid question based on strong understanding of STEM concepts (middle school) and/or makes a significant scientific contribution, basic or applied (high school);
- Shows originality and creativity;
- Thorough project which is well-planned, implemented and articulated;
- Strong evidence of high-quality independent work;
- Superior project for age, educational background, work environment and/or in relation to other projects.

1. **Middle School Honor Awards for the Best Projects**

**DOROTHY KNOWLTON AWARD, Grades 7-8**

**Description:** Given to the middle school student or team presenting the best project in the life and earth sciences. This is given in honor of Dorothy Knowlton, the former Science Coordinator of Arlington County, who was instrumental in advancing experimental design with the science curriculum.
Procedures: A panel of honor judges selects the winner from among the first place projects in the Animal and Human Sciences, Ecology and Earth Science, Human Behavior, Plant Science, Microbiology, and Team (if appropriate topic) middle school sections. Winner is given a certificate(s).

JOYCE K PETERSON AWARD, Grades 7-8
Description: Given to the middle school student or team presenting the best project in the physical sciences. This is given in honor of Joyce Peterson who has been an outstanding teacher in the Arlington County Schools.
Procedures: A panel of honor judges selects the winner from among the first place-projects in the Chemical Science, Engineering & Technology, Physical Science & Astronomy, and Team (if appropriate topic) middle school sections. Winner is given a certificate(s).

OUTSTANDING EIGHTH GRADE RESEARCH PROJECT, Grade 8
Description: Given to the eighth grade student or team presenting the best project.
Procedures: A panel of honor judges selects the winner from among the eighth graders who placed first in a middle school section. Winner is given a certificate(s).

VJAS GRAND MIDDLE SCHOOL AWARD, Grades 7-8
Description: Given to the middle school student or team presenting the best project.
Procedures: A panel of honor judges selects the winner from among the first place projects in the middle school sections. Winner is given a certificate(s).

2. High School Honor Awards for Best Projects

CATESBY JONES AWARD, Grade 12
Description: Given to the individual senior (12th grade) student presenting the best project.
Procedures: A panel of honor judges selects the winner from among the seniors (12th graders) who placed first in a high school section. Winner is given a certificate.
Criteria:
1. Significant scientific contribution, basic or applied.
2. The originality of thought.
3. Independent student effort.

VJAS DELEGATES TO AJAS, GRADES 9-11
Description: The top four research projects by individual or team student projects in grades 9-11.
Procedures: A panel of honor judges selects the honorees from among the students (grades 9-11) who won first place in a senior high section. The projects are ranked from “1” to “4”. Winners are the first and second ranked projects. Alternates are the third and fourth ranked projects.
Attendance at American Junior Academy of Science (AJAS): Winners are given a certificate and an invitation to represent VJAS at the annual meeting of the American Junior Academy of Science (AJAS) and to present at a poster session. Students who represent the Commonwealth of Virginia are required to attend all activities and house with the students (if applicable). When VJAS/VAS finances permit, cash awards are given to each individual or a team to help defray expenses. The cash award will be the same for an individual or team, so if a team is selected they will need to determine who will represent the team, or provide local funding for the other team members. The top four papers are ranked by the judges and VAS/VJAS will provide cash awards in this order when VAS/VJAS finances permit. VAS/VJAS will attempt to fully cover the expenses of the winners followed by the alternates.

ERTLE THOMPSON MEMORIAL ENDOWMENT AWARD, Grades 9-11
Description: The Ertle Thompson Memorial Endowment Award is established to honor Dr. Ertle Thompson, a long-term leader of VJAS and a former president of the VAS. When financial circumstances allow, these awards will be presented annually to the winners selected as the VJAS Delegates to the AJAS. The purpose of the funds is to help support attendance at the annual meeting of the American Association for the Advancement of Science and the American Junior Academy of Science.

Procedure: The winning students selected as the VJAS Delegates to the VJAS will also receive this award. If a student does not attend AJAS, then it will be transferred to another student.

VJAS GRAND HIGH SCHOOL AWARD, Grades 9-12
Description: The top research project by an individual or team of students in grades 9-12.
Procedure: A special panel of judges selects the winner from among the first place winners of all senior high sections. Winner is given certificate(s).

3. Award for Student’s School Sponsor

DR. R. DEAN DECKER HONORARIUM AWARD
Description: The Dr. R. Dean Decker Honorarium award of $500 each will go to the teacher/sponsor of the two top student winners of the VAS Best Research Award. The monies can be used at the discretion of the recipients as long as it is related to the attendance at the AJAS meeting. Guidelines and procedures for the recipients will follow later.

Procedure: The teacher/sponsor of students who receive the VAS Best Research Awards will receive this award.

4. Award for Outstanding Service by Students

VIRGINIA ACADEMY OF SCIENCE HONORARY MEMBERSHIP
Description: A certificate and one year’s membership, without cost, in the Virginia Academy of Science including a subscription to the Virginia Journal of Science, will be awarded.
**Procedure:** A club sponsor, any VJAS Committee member, or a member of the VAS may make Nominations. Nominations and supporting materials are to be sent to the VJAS Director prior to the Research Symposium. The award is based upon one or more of the following criteria. The VJAS Committee selects the winner(s).

**Criteria:**
1. Serving as an officer of the VJAS.
2. Working in a commendable manner for a local or state VJAS activity.
3. Dedication to being a good VJAS member as exhibited by assistance in such activities at the Research Symposium as registration, balloting, and program planning.

**5. Awards for Outstanding Service by Adults**

**VJAS DISTINGUISHED SERVICE AWARD**

**Description:** A special certificate is presented to a person for exceptionally outstanding service to the VJAS and public recognition is given at the Research Symposium. This is the most prestigious award that the VJAS gives.

**Procedure:** The selection of the person or persons to receive this award is the responsibility of the VJAS Committee and recommendations may be made at any of the regular committee meetings. One or more may be chosen in any year but it is expected that the giving of this award will not be an annual event.

**Criteria:** No set criteria are described. The award is given only when the time of service devoted to the VJAS and its aims is deemed exceptionally outstanding and distinguished.

**VAS AWARD FOR DEDICATED SERVICE TO VJAS**

**Description:** Highest service award of the Junior Academy. This award recognizes a past VJAS officer or VJAS member who has continued to provide support as a volunteer to the Junior Academy even after completion of high school.

**Procedure:** The selection of the person or persons to receive this award is the responsibility of the VJAS Committee and recommendations may be made at any of the regular committee meetings. One or more may be chosen in any year but it is expected that the giving of this award will not be an annual event.

**Criteria:** No set criteria are described. The award is given only when recognition is deserved through outstanding and distinguished support.

**VAS Franklin D. Kizer Teacher Development Fund Awards**

The following three VAS-VJAS awards are supported by the Franklin D. Kizer Fund. The purpose of the Fund is to develop and encourage Virginia Science Teachers. The Fund was established by Art Burke and Virginia Ellett in honor of “Doc” Kizer, past State Science Superintendent, Virginia Department of Education and first President (1952-53) of the Virginia Association of Science Teachers. Its corpus was derived from a transfer of funds to the Academy that constituted the remainder of monies used for the annual state science teachers’ conference when that conference ceased. VAS members Frank Kizer, Art Burke and Virginia Ellett were
among that conference’s leaders and coordinators. An individual may not receive each of the following awards more than once.

It is not required that any of the following awards be made each year.

**The Franklin D. Kizer Science Teacher of Tomorrow Award**

This award recognizes an outstanding Virginia science teacher and provides an opportunity for professional development through attendance at the annual VAST meeting.

**Criteria:**

- The recipient is a teacher with a maximum of 5 years of teaching experience.
- The recipient will have sponsored student participation at the VJAS annual meeting.
- The recipient is nominated and chosen by the VJAS Committee.
- This award will be used to support the professional development of the recipient by providing the funds needed to attend the annual VAST meeting. The maximum amount of the award is $500.

**The Franklin D. Kizer Fund Distinguished Service Award in Honor of E. C. L. Miller**

This award recognizes the exceptional contributions to VJAS of a STEM teacher.

**Criteria:**

- The recipient will be a teacher who has contributed to the VJAS by sponsoring student research projects, serving as a reader, judge, and/or member of the VJAS Committee.
- The teacher will be nominated and chosen by the VJAS Committee.
- The award of up to $500 will be used for professional development, and the recipient will propose a professional development activity to the Director of the VJAS. Examples of acceptable proposals include attendance to a professional meeting, tuition for a science/math course, or software to enhance their teaching effectiveness.

**The Franklin D. Kizer Professional Development Stipend**

This award will be presented to a teacher of a winner of the VJAS Best Research Paper Award.

**Criteria:**

- The recipient is a teacher and is active with the VJAS.
- Funds up to $500 will be used to support the professional development of a teacher-sponsor of a VJAS Best Research Paper Award winner upon their attendance to the annual AJAS/AAAS meeting.

[Return to Table of Contents]
VIII. SCHOLARSHIPS

Scholarships must be applied for in advance of the VJAS Research Symposium via the Reviewr platform. Only students whose papers are accepted for presentation are eligible for scholarships.

Only students who present their paper at the meeting may be awarded a scholarship.

Application is made by submitting the application form via the Reviewr platform.

- Scholarship Application: Bethel High School
- Scholarship Application: Virginia Environmental Endowment (VEE)

Follow the instructions on the form exactly. Application forms and accompanying information must be completed by April 30.

SPECIAL SCHOLARSHIPS. Special panels of judges at the VJAS Research Symposium determine these scholarships. There is no appeal process for these decisions.

SCHOLARSHIPS PROVIDED BY THE VIRGINIA ENVIRONMENTAL ENDOWMENT

The Frances and Sydney Lewis Environmental Science Scholarship
This $5,000 four-year college scholarship may be awarded to the student whose project presented at the VJAS Research Symposium evidences the most significant contribution in the field of Environmental Science. The purpose of the award is to stimulate interest in environmental sciences and to enable promising young students to pursue undergraduate studies in a related field. The Virginia Environmental Endowment (VEE) and the VJAS offer this scholarship in tribute to the outstanding and generous services of VEE Directors Emeriti, Frances A. Lewis and Sydney Lewis.

The Henry W. MacKenzie, Jr. Environmental Scholarship
This $5,000 four-year college scholarship may be awarded to the student whose project presented at the VJAS Research Symposium evidences the most significant contribution in the field of Environmental Science dealing with the James River Basin and the Chesapeake Bay. The purpose of the award is to stimulate interest in environmental sciences and to enable promising young students to pursue undergraduate studies in a related field. The Virginia Environmental Endowment (VEE) and the VJAS offer this scholarship in tribute to the outstanding and generous services of Judge Henry W. MacKenzie, Jr. one of the founding directors of VEE who had a great interest in the James River and the Chesapeake Bay.

Procedure: The application process is accomplished by submitting an Application for Scholarships provided by the Virginia Environmental Endowment (VEE) form along with the required information listed below. The application and supporting documentation is completed and submitted via the Reviewr platform.

- In order of preference, the colleges and universities to which you will apply.
• In what field of study do you plan to concentrate?
• Describe your career plans.
• List your awards and honors.
• Describe your school activities and explain your role.
• Describe your community activities and explain your role.
• An unofficial copy of your transcript.
• Two (2) letters of support from current and past science teachers.
• Five (5) additional copies of your research paper.

A special panel of judges will consider the application to include the presentation, forms and research papers of the selected winner(s) at the VJAS annual competition. The scholarship recipients will be announced at the awards presentation. VJAS will notify VEE in June of the recipients. VEE will then notify the recipients of the process for funding. Scholarship funds will be paid by the Virginia Environmental Endowment (VEE) to the recipients’ selected college or university in installments over the four-year academic period. The funds may be used for tuition, fees, books, and room and board. VEE and the college or university will establish payment schedules, and the student will be responsible for submitting progress reports and grades to VEE in order to maintain support.

Criteria: The recipient must be a Virginia resident enrolled in an accredited public or private high school (grades 9-12) in Virginia at the time of the VJAS Research Symposium. The recipient must present an outstanding paper on a topic related to environmental science at the VJAS annual competition. (Only papers dealing with the James River and the Chesapeake Bay are eligible for the MacKenzie Scholarship.) The recipient must demonstrate leadership abilities, academic achievement, and well-rounded participation in school and community affairs. The recipient must demonstrate an active interest in environmental sciences and intend to enroll as a full-time student in an accredited college or university in the United States.

Notes: Only single authors may apply. A single application packet may be used to apply for both the Lewis and MacKenzie scholarships. A previous winner of a VEE scholarship is no longer eligible for another VEE scholarship. VEE scholarships will not be awarded to a student who will be attending a private institution whose primary purpose is to provide religious or theological training. Students will be considered for both VEE awards.

BETHEL HIGH SCHOOL SCHOLARSHIP
Description: This scholarship of $1000 is awarded to a student (9-12 grades and not a team project) who has produced an outstanding written paper and is a first-place winner. The money is paid to the student’s college or university in two equal payments during the first year. The student must give VAS proof of enrollment for the first semester and evidence of satisfactory progress from the first semester for the second-semester installment. This scholarship comes from the interest earned from a $10,000 endowment contributed to the VJAS by the students of Bethel High School, Hampton, Virginia.
Procedure: A special panel of judges will select the winner from among the first place papers of all high school students who applied for the award using the Reviewr platform.
IX. OPERATION OF THE VJAS

A. VJAS COMMITTEE

The operation of the VJAS is the responsibility of the VJAS Director and a volunteer committee appointed by the VAS who works within the framework of its policies. The Junior Academy officers represent students on the committee. Committee members are assigned to perform the numerous tasks of the VJAS. These assignments may occur in areas of the Fundraising, Handbook Revisions, Reader Chairs, Section Chairs, VJAS Voice (VJAS Newsletter), Graduate Records, The Proceedings, Publicity, Local Arrangements, Special Meeting Functions, AJAS Arrangements, and subcommittee appointments. Committee members who fail to attend more than two consecutive committee meetings will be removed from the committee. Committee members may be reinstated at the discretion of the VJAS Committee Chair or the VJAS Director.

The Committee meets during the Research Symposium and the fourth Saturdays of January and June (unless otherwise notified) to conduct the business of the VJAS.

B. RESEARCH SYMPOSIUM AND ANNUAL MEETING

The goal of the VJAS is to promote progress in the field of scientific research among secondary school students. The Research Symposium and Annual Meeting of the VJAS, held in conjunction with that of the VAS, emphasize this goal. It is here that several facets of the VJAS program culminate. Among them are the presentation of outstanding individual research projects, the announcement of state winners in VJAS competitions, guest speakers, and the annual business session at which VJAS student officers for the coming year are elected. In the event that the physical Research Symposium is canceled, a virtual meeting may be held.

The focus of the Research Symposium is the presentation of accepted research papers submitted by VJAS members. During this time the Annual Meeting is held to elect student officers.

Anyone interested in the activities of the VJAS may attend the Research Symposium and the Annual Meeting. There is a non-reimbursable registration fee for the meeting that is announced on the VJAS website prior to the Research Symposium. Everyone attending is expected to register. Preregistration is strongly encouraged.

The VJAS Committee will handle publicity of general interest, but each school is encouraged to arrange for its own local publicity concerning the Research Symposium. During the Research Symposium sponsors are responsible for the conduct and behavior of the students under their supervision. The VJAS incurs NO liabilities for any person attending this Research Symposium.
C. JUNIOR ACADEMY OFFICERS

Student Officers. Officers are elected or appointed or re-appointed, each year, at the discretion of the VJAS Director. This decision is informed by several factors including representation of as many schools in Virginia as possible, prior participation in VJAS, and prior experience as a VJAS junior officer. VJAS junior officer positions are filled by high school students and include: President, Vice-President, Secretary, Editor-in-Chief and Communication Liaisons. These officers, selected from and by the statewide student membership of the VJAS, work with the VJAS Committee and serve under the direction of the VJAS Director, VJAS Committee Chair, and VJAS Committee Vice-Chair. The school of a student officer must be a member of VJAS. If the school is not a member then the student must become an individual member. Parents may act as sponsors but must fulfill the role as well by participating, registering and staying onsite at all times as the designated Chaperone. Student officers are to have on-campus housing with their sponsor and are to be registered for the symposium. If any of these requirements are not met then the student officer will have to resign their position.

Officer Sponsors. Each candidate for office is required to have a sponsor. This position as a “state officer” is a great opportunity for the student officers, and it is the responsibility of the “officer sponsor” to advise and encourage them. Officer sponsors, therefore, are invited to serve a one-year membership on the VJAS Committee, which meets on the fourth Saturdays in June and January (unless otherwise notified). It is also the sponsor’s responsibility to provide transportation for the officers to and from the meetings and to participate in the work of the Committee by attending Committee meetings and supporting the activities of the officers. Sponsors need to be on campus at all times with their students. Parents may act as student sponsors but must fulfill the role as well by participating, registering and staying onsite at all times as the designated Chaperone. Student officers are to have on-campus housing with their sponsor and are to be registered for the symposium. If any of these requirements are not met then the student officer will have to resign their position. Please note, that in the event that an in-person symposium is not held, officer elections may not be held. Officer candidates will then be assigned duties at the discretion of the VJAS Director and VAS/VJAS Committee Chair.

1. Duties of Officers
All officers should be dressed in business casual attire during VJAS General Sessions, Awards Ceremony, and during presentations.

The President is charged with presiding at the Annual Meeting and helping on various subcommittees. The President submits an article(s) for the VAS newsletter, The Virginia Scientists, assisted by the sponsor of the school in which the President has a membership. The President is the head representative of the student body and is the only voting member of the VJAS Committee. The Office of President candidate must be a current officer or one that has participated in the meetings prior to the year of taking office.
The **Vice-President** works with the President and on subcommittees. The Vice-President should be prepared to fulfill the duties of the President should the President be unable to perform the duties of the office.

The **Secretary** records the minutes of the VJAS Committee meetings and the Annual Meeting and submits them in writing to the VJAS Director and the VJAS Committee.

The **Editor-in-Chief** is responsible for the compilation of the *VJAS Voice*. This includes contacting the appropriate persons, assembling articles and pictures, and editing the VJAS voice. The Editor-in-Chief may choose to contact other committee members or sponsors for opinions, interviews, or help.

The **Student Communication Liaisons** shall act as representatives of the school divisions included in their region. Their primary role is to relay meeting proceedings and distribute the Voice to VJAS sponsors and attendees in their region. They are also expected to advertise the VJAS in their designated region. They may use a variety of platforms such as flyers, public appearance, website updates and social media to inform schools of the VJAS policies, positions, and opportunities.

The **Regional Directors** represent the 8 Superintendent’s regions. These students act to represent their student stakeholders and assist in recruiting new members and participants. The regional directors are non-voting members of the VJAS Committee.

### 2. Qualifications for Office

a. Candidates for President, Vice-President and Secretary must be rising 11th or 12th graders. Candidates for Editor-in-Chief and Communication Liaison must be rising 10th, 11th or 12th graders. All candidates must be VJAS members in good standing.

b. Candidates must have submitted a research paper for competition at the Research Symposium either for the current year or a past year. Preference may be given to members who have submitted a paper for the current year.

c. Officers should be able to attend VJAS Committee meetings (summer and winter), and the annual Research Symposium. An adult must accompany you to the summer and winter meetings - whether that be your teacher sponsor from your school OR in lieu, one of your parents. Missing more than one Committee meeting will result in an officer being removed from office.

d. Officers also expected to attend monthly calls to confer with the President on student engagement, VJAS Voice, and membership outreach issues.

e. Candidates for office of President must be current officers in good standing.

### 3. Applications for Office and Campaigning
Each year a school may nominate ONLY ONE student for any of these offices and at no time will there be more than one officer from the same school, unless there are no other nominations. Nominations are made without regard to sex, race, color, or creed.

All candidates for office in the VJAS must complete the “Application for Junior Officers.” in Reviewr.

The application must have the signatures of the candidate, officer sponsor and principal; unsigned applications are not acceptable. The student must have officer sponsor approval and support and principal support.

Candidates should be dressed in business casual attire at ALL times. Candidates will attend the General Sessions with their school. At the appropriate time, candidates for each office will be called on stage. There will be NO floor nominations or nominating speeches at the General Session. The presiding officers will introduce each candidate. Each candidate will then have two (2) minutes to address the General Session.

There is NO formal campaigning, including posters, demonstrations, etc., during the Research Symposium or at the Annual Meeting.

4. Elections
Each dues-paying school in attendance will have one vote for each office. Ballots may be electronic. Results of the election will be announced at the close of the Research Symposium. Please note, that in the event that an in-person Symposium is not held, officer elections may not be held. Officer candidates will then be assigned duties at the discretion of the VJAS Director and VAS/VJAS Committee Chair.

D. VJAS PUBLICATIONS
The *VJAS Proceedings* is an annual publication of the VJAS edited by members of the VJAS Committee. The *VJAS Proceedings* are published to present a permanent record of the activities at the Research Symposium and Annual Meeting of the VJAS. As of 2012, the *VJAS Proceedings* will be distributed online. The *Proceedings* consist of:

- Meeting Information
- VJAS Committee Members and Officers
- The list of all award winners
- The abstracts of all presenters
- The complete papers of the winners of the “Best Paper Presentations”

The *VJAS Handbook* is a booklet with a dual purpose. Primarily, it is a promotional publication of the VJAS designed to present the aims and activities of this organization to secondary schools interested in affiliating with the VJAS. Secondarily, the *Handbook* serves to describe the operation of the VJAS, the procedure for electing VJAS officers, guidelines for conducting research investigations and writing the report thereof, and procedures to
participate in the awards competition. The VJAS Handbook, with the Appendix posted separately, can be found on the Academy website at www.vjas.org.

E. GENERAL RULES AND CODE OF CONDUCT

Your stay at the Research Symposium is too short for any part of your time to be wasted. Your schedule is concentrated and arranged in a period of three tightly structured days. The staff depends on your complete cooperation to make this intensive and complicated operation run smoothly.

The VJAS is successful because of the spirit of enthusiasm and commitment that prevails. You are here because you want to be here and the sponsors are here because they like being involved in a dynamic and exciting program of scientific study. Courtesy and punctuality are essential, as is ready and cheerful compliance with regulations, which are necessary to guarantee an optimum learning environment for each of the students in the Research Symposium.

No discipline problems are expected but it is important that our rules be clearly understood. The VJAS has no desire to make moral judgments or to dictate proper conduct for an individual’s normal daily life. However, during the symposium, the VJAS expects an acceptance on the part of the students, their parents, their sponsors and chaperones, and their schools of the rules and policies of the VJAS. The following rules apply to all students and sponsors attending the VJAS Symposium.

General Rules
1. All students must be chaperoned by their registered sponsors at all times.

2. All sponsors are responsible for their participants.

3. Each participant should carry their own personal medical information on them at all times.

4. All sponsors and participants should have a phone tree to contact each other in case of an emergency

5. Curfews: Curfews are imposed and must be followed.

6. Attendance: You have a full-time commitment to the VJAS programs and are required to attend all scheduled activities. No loitering or distractions are allowed. Permission from your sponsors is required for your absence from a scheduled activity.

Code of Conduct
1. Drugs and Alcohol: The use or possession of intoxicants of any kind is strictly forbidden at all times regardless of the student’s age.
2. Conform to the principles, practices, and procedures outlined in host school rules and regulations.

3. Students and sponsors must demonstrate self-respect and respect for others. Stealing or possession of stolen property, physical attack, trespassing, and insulting, abusive, or racist language is not tolerated by the VJAS and will result in the expulsion of the individual(s) from the Research Symposium.

4. Refrain from intentional damage or defacing of host institution property. Schools are responsible for any damage to University property or items misplaced, such as keys and linens. Any damages charged by the host institution to a member school or individual for damages will be billed back to the member school or individual. The member school or individual will not be permitted to participate in future VJAS events until the situation is rectified.

5. Cultivate a harmonious relationship between the VJAS and the host institution. Use your influence to prevent acts of vandalism that lead to the destruction of host institution property. Any damages charged by the host institution to a member school or individual for damages will be billed back to the member school or individual. The member school or individual will not be permitted to participate in future VJAS events until the situation is rectified.

6. Display good sportsmanship when participating in or attending any VJAS activities.

7. Follow any rules and guidelines imposed by the student’s sponsors and/or school.

Behavior considered inconsistent with these rules or any actions inconsistent with the standards of the VJAS will result in the student and/or sponsor being excluded from participation in VJAS activities.

No part of any fee will be reimbursed due to an individual being excluded from participation in VJAS activities for disciplinary reasons.

NOTE: VJAS assumes no liability for students and sponsors and is held harmless.

Appendix

i - Submission and Paper Formatting Check-list

SUBMISSION CHECK-LIST

● All papers must be on the Reviewr platform by March 2, 2022.

● An Entry Fee is required for each student submitting a paper and is due with the paper.
All Entry Fees must be received by the paper submission deadline; the paper submission deadline for the current year is Wednesday, March 2, 2022. Invoices are available upon request from the VAS Office; requests must be made in time to meet the deadline.

a. **Members** (students from Member Schools and Individual Members). $15 per student.
   - Each Member School can submit a single check (single payment) for all of the entry fees received from the students from its school. Payment is to be made (or payment method indicated) online via the Reviewr platform.
   - The parent/guardian of an Individual Member should submit a check for his/her child’s Student Entry Fee. Payment may also be made online via the Reviewr platform.

b. **Non-Members at time of VJAS Paper Submission on March 2, 2022.**
   - Submit VJAS Special Interest Award Applications, paper, and any other requested material using the Reviewr platform by April 30. Follow instructions exactly. **DO NOT** submit any Special Interest Award applications until after paper acceptances have been received, but feel free to prepare them early due to time constraints.

**PAPER FORMATTING CHECKLIST**

**A. Rules for formatting the paper.**
- The abstract and body of the paper (including all parts of the paper) have been typed/word-processed with line spacing set to no less than 1.5 and not greater than 2.0 (Exception: long quotes, figures, legends, within literature citations). Papers and forms may be printed double-sided. When printed the 14 page paper (not including entry forms) can occupy 14 sheets of paper printed single-sided or 7 sheets of paper printed double-sided.
- All margins - top, bottom, and sides are not less than one inch (1") on ALL pages including appendices.
- **Number the pages**, beginning with the abstract which is page 1. Put page numbers in the footer, which can be within the margin and the only exception to the one-inch margin.
- The paper is printed in no smaller than 12 pt. type size using one of the following fonts: Arial, Helvetica, Times New Roman, Courier, or Geneva.
- **Do not use footnotes.** Use parenthetical citations (Author, Year).

**B. Text. The abstract begins the fourteen (14) pages of text allowed in the body of the paper (all pages are formatted with line spacing set at 1.5-2.0 on 8½” by 11” paper). The paper consists of the following sections which should be labeled, with the labels bolded, underlined or both.**
- **Abstract (1 page only):** This is the first page of the 14 pages of text.
- **Introduction.**
- **Methods and Materials.** Do not list materials - use paragraph format. **For projects involving human subjects, informed consent/assent/permission**
forms and/or parental permission were obtained and will be stated in the Materials and Methods. A copy of the informed consent form has been included as an image in the Materials and Methods section. The image need not take up an entire page.

- **Results.** Includes a written summary of the results, graphs, tables, figures and/or photographs of the summarized data, and an analysis of the data.

- **Discussion and Conclusions**

- **Literature Cited:** This is not a bibliography. It is a list of the literature cited in the text.
  - There must be a minimum of three peer-reviewed/scholarly sources for middle school papers and a minimum of five peer-reviewed/scholarly sources for high school papers.
  - Each must be cited at least once in the body of the paper.
  - List peer-reviewed/scholarly and non-peer-reviewed sources in separate sections.
  - Students in grades 9-12 must use APA format, the standard format of the *Virginia Journal of Science*.
  - Students in grades 7-8 may use either MLA or APA format.

- **Appendix (optional)**

*This ends the total paper with a maximum of 14 pages.* Papers exceeding this will be disqualified. Do not include acknowledgments.*
ii - DQ Criteria
VJAS Paper Disqualification Form

This paper has been disqualified for the following reason/reasons:

DOES NOT COMPLY WITH BASIC REQUIREMENTS SET FORTH IN THE HANDBOOK

☐ Margins
☐ Type size
☐ Single spaced
☐ Page not numbered
☐ Abstract over 1 page
☐ Total paper length (over 14 pages)
☐ Acknowledgements included
☐ Footnotes included
☐ Sponsor submissions verification is missing.
☐ Student-generated forms reference VJAS without prior approval from the director
☐ Improper format

SAFETY AND PROCEDURES

☐ Failure to include an image of the required Consent Form in the Materials and Methods (humans)
☐ The explicit statements of safety protocols is missing from the Materials and Methods section.
☐ E-coli projects: E-coli K-12 strain is not explicitly stated
☐ IRB committee or the equivalent approval was not attained for projects involving human subjects

CITATIONS

☐ In-text citations don’t match “Literature Cited” (Named improperly such as “Bibliography” or “Works Cited”)
☐ Lack of, or not identifying, peer-reviewed/scholarly sources (at least 3 for MS, at least 5 for HS)
☐ Improper format

PROPER CERTIFICATION FORMS MISSING OR NOT SIGNED

☐ Vertebrate

Return to Table of Contents
☐ Human Subject

☐ Recombinant DNA

☐ Tissue/Cells

☐ Pathogenic agents, controlled or toxic substances

☐ Mentor and/or research facility

☐ Mentor form

☐ General Safety Conduct

☐ Ineligible/inappropriate category. Belongs in

☐ Other – explanation:
iii - Reviewr Instructions for Sponsors (See Posted Sponsor’s Updates)

Note: This section will be updated as the submission process and timeline unfolds.

I. Instructions for becoming a member of VJAS and paying membership fees

NOTE: For School Memberships follow steps A, B, C, D. For Individual Memberships follow steps A, B, C, E.

**Link to Instructional Video**

A. Navigate to the VJAS online submission site (tbd, see sponsor’s update).

B. Click ‘Create an Account and Apply’.

C. Complete the form to create a Reviewr account. Use an email address that will accept emails from Reviewr.

D. If you are the head sponsor at a school, select the option to complete the school membership and payment.
   1. Complete all fields in the form. For phone numbers, include the best phone number for contact.
   2. If your school has no teacher sponsors, put N/A in the field.
   3. Payment
      a) If you are paying online, select pay online.
      b) If you are paying by check, select pay by check.
         (1) You will need to know the check number.
            (a) Email the VAS office (associate-director@vjas.org) and request an invoice.
            (b) Give the invoice to your school’s treasurer.
            (c) Once you have the check then fill out the online membership application and mail the check to the VAS Office.

4. Student Entry Fees
   a) If your school is paying for the $15 student entry fees, select yes. This will allow your students to by-pass the payment portal when they submit their papers. Your school will be sent an invoice for payment of all entry fees associated with your students.
   b) If your school does not pay the $15 student entry fee, select no. Students will be prompted to pay the entry fee to complete the paper submission process.

E. If you are a parent of a student who is home schooled or of a student whose school is not a VJAS member, then select the option to become an individual member.
   1. Complete all fields in the form. For phone numbers, include the best phone number for contact.
2. Payment
   a) If you are paying online, select pay online.
   b) If you are paying by check, select pay by check.

II. Instructions for Sponsors to check and verify student submissions (see VJAS.org)

vi - Student Officer Application

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone #</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailing Address</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-mail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Officer Sponsor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-mail</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Desired Office:
☐ President
☐ Vice President
☐ Secretary
☐ Editor-in-Chief
☐ Communications Liaison

The following questions are to be answered in the space provided. **Answers are not to exceed the front of this sheet of paper.** Please attach the two-minute speech you plan to make in front of the Academy in running for this office.

1. What other leadership experiences have you had? Include the length of any office(s) and any awards won in association with that office.

2. If elected to office, what changes or improvements would you suggest for the VJAS?

3. If you had to tell the voters one reason why you are the best candidate for office, what would that one reason be?

Candidates Signature       Date       Parent’s Signature       Date
▪ In signing, I agree to support this student in their role as an officer if elected and serve as a member of the VJAS committee for that year.

Officer Sponsor’s Signature       Date
▪ I hereby recommend the above student as a candidate for office in VJAS and support both the student and sponsor in their roles

Return to Table of Contents
vii - Phil Robinson Research Grant Application

Guidelines for the Phil Robinson Research Grant Application

- Research grant funds are available to students in grades 7 through 12 who attend public or private schools or are home-schooled.
- In order for a public or private school student to be eligible to apply for this grant the student’s school must have already become affiliated with VJAS for the current school year (i.e., must have submitted the school’s VJAS School Membership Application and School Membership Fee to the VAS Office no later than the November 1 deadline for submission of grant applications). It is the student’s responsibility to check with his/her sponsor so that the sponsor will contact the VAS/VJAS Office for confirmation that the school has joined VJAS as a School Member.
- In order for a home-schooled student to be eligible to apply for this grant he/she must have already joined VJAS as an Individual Member for the current school year (i.e., the student’s parent/guardian must have submitted the VJAS Individual Membership Application and paid the Individual Membership Fee to the VAS Office no later than the November 1 deadline for submission of grant applications). It is the parent’s responsibility to contact the VAS/VJAS Office for confirmation that the student’s Individual Membership Application and Membership Fee have been received and accepted.

- Please follow the guidelines below as well as the instructions that appear on the Grant Application form. Also, see “Conducting Research” #7 in the Handbook for further Guidelines for these Grants.

1. The supporting information for a grant should be limited to two pages (not counting the application form). It should include the title of the research, a brief statement regarding the purpose of the research, a brief statement regarding how the research is to be carried out, and a list of materials needed with prices and sources of these materials.

2. When multiple students at the same school submit grant requests, the pooling of materials should be considered. Each person does not need a pound of seed when five people are working with Wisconsin fast plants.

3. When considering the request, consider substituting less expensive equipment for the scientific form. If the research is to follow a published research project that used beakers, consider Mason jars instead of the much more expensive beakers. Consider various sizes of Ziploc bags, Gladware containers, etc.
4. Consider other than for materials. Soil can come from many sources other than from a scientific supply house.

5. The following is a list of items that will not be funded:
   a. film & developing
   b. presentation materials
   c. travel
   d. items that should be present at the school such as Petri dishes, standard glassware, standard chemicals, computer supplies, and paper products
   e. items that are excessively expensive (which are anything over $250.00)
   f. food items such as soft drinks, meals, etc.

PHIL ROBINSON RESEARCH GRANT APPLICATION

Deadline: Must be received by the VJAS Director by November 1.

1. Name: Grade:
2. Mailing Address:
3. Name of Student Sponsor: Tel. No. Email
4. Project Advisor (If different from Student Sponsor)
5. School:
6. Title of Research Project:
7. On an attached sheet, enclose a Project Description* which describes the following:
   ● Purpose of research
   ● Procedure for testing hypothesis or a description of experimental design
   ● Itemized list of all SUPPLIES to be purchased with grant funds and the approximate cost of each item. Remember, equipment cannot be purchased with grant funds.
8. Total Amount Requested: $ _______________________
9. ENCLOSE STATEMENT FROM SPONSOR* SUPPORTING PROJECT.
   (Sponsor: Please verify the feasibility of the project for this student in the setting in which it is to be accomplished.) Each grant application must have a support letter.

*Note: Before mailing your application via Priority Mail, assure that your Project Description and the Sponsor Statement are enclosed.

Any student who receives research funds must submit a VJAS paper. If the student’s paper is accepted for presentation the student is committed to attend and present his/her paper at the Research Symposium. Anyone who does not is in violation of the fund and monies received by that student must be returned to the Phil Robinson Endowment Fund.

10. Student’s Signature:
11. Student Sponsor’s Signature:

STUDENT: Do not write below this line

For use of the Phil Robinson Research Committee

_____ Approved Date: __________

_____ Disapproved Date: __________

Amount: $ __________

Send the completed form via email to Susan Booth, director@vjas.org.

viii. Reader’s Scoring Rubric (on Reviewr; posted here for reference)

ABSTRACT: A concise statement of the problem, approach, key results, and conclusion

INTRODUCTION: Clear statement of rationale (reason) for the project; clear statement of the problem to be addressed; sufficient explanation of background concepts; reflects accepted practices in the STEM discipline; uses a variety of strong valid references

METHODS/MATERIALS: Clear explanation of procedures which includes materials and equipment used; includes safety precautions which are consistent with risk analysis; appropriate use of materials, equipment, and technology; the design is consistent with STEM discipline

RESULTS: Contains sufficient trials, design iterations, or proofs; collected over an appropriate time period; appropriate data tables, graphs, or other visual presentations; appropriate statistical and/or other mathematical methods; addresses unexpected events or data; verbally summarizes key findings

DISCUSSION/CONCLUSION: Relates major findings to problem investigated; uses STEM literature to explain findings; articulates strengths, weaknesses, and improvements needed; describes applications of research and potential future projects

GENERAL ASSESSMENT OF PAPER: Consistent with reporting procedures in the STEM discipline; components are clearly and succinctly written; correct spelling and punctuation; references from reliable publications – scholarly and peer-reviewed; follows the required style manual for citations and references
IX. Judge’s Scoring Rubric (on Reviewr; posted here for reference)

I. RESEARCH PAPER

ABSTRACT: A concise statement of the problem, approach, key results, and conclusion (10 points)

INTRODUCTION: Clear statement of rationale (reason) for the project; clear statement of the problem to be addressed; sufficient explanation of background concepts; reflects accepted practices in the STEM discipline; uses a variety of strong valid references (20 points)

METHODS/MATERIALS: Clear explanation of procedures which includes materials and equipment used; includes safety precautions which are consistent with risk analysis; appropriate use of materials, equipment, and technology; the design is consistent with STEM discipline (20 points)

RESULTS: Contains sufficient trials, design iterations, or proofs; collected over an appropriate time period; appropriate data tables, graphs, or other visual presentations; appropriate statistical and/or other mathematical methods; addresses unexpected events or data; verbally summarizes key findings (20 points)

DISCUSSION/CONCLUSION: Relates major findings to problem investigated; uses STEM literature to explain findings; articulates strengths, weaknesses, and improvements needed; describes applications of research and potential future projects (20 points)

GENERAL ASSESSMENT OF PAPER: Consistent with reporting procedures in a STEM discipline; components are clearly and succinctly written; correct spelling and punctuation; references from reliable publications – scholarly and peer-reviewed; follows the required style manual for citations and references (10 points)

II. SYMPOSIUM PRESENTATION

PRESENTATION: Comfortable with communicating information (not reading audiovisuals); engages the audience through eye contact, volume, and pace of presentation; uses visuals that are sufficiently large, attractive, and increase audience’s understanding of the topic; comfortable with using technology; stays within the timeframe (35 points)

III. QUALITY OF RESEARCH

Assess the Quality of Research of the Project. Look to see if the research addresses high-quality problem which is important for the STEM discipline; seeks to solve a problem whose results are not obvious to the student given their educational background; shows ingenuity in design, methodology, or analysis; strong evidence that student did the work and understands the project (35 points)

GENERAL IMPRESSION: Represents a high quality project for age, educational background, and/or work environment; evidence of growth in research skills throughout the project; evidence that student is interested and invested in project; quality of project in relation to other presenters, e.g. outstanding, good, average, below average (15 points)