

The Virginia Junior Academy of Science and Research Symposium (Juried Science Experience)

Official Handbook of Rules & Guidelines



2025 - 2026

Non-Profit 501(c)(3) - Donations Accepted

The Virginia Academy of Science is incorporated in Virginia as a charitable, scientific, and educational organization, is an IRS 501 (c) 3 qualified organization, and is registered with the Virginia Department of Consumer Affairs.

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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. Please contact the VJAS Director directly if you have any questions.

The VJAS Leaders acknowledges the support from the following individuals and organizations:

The Virginia Environmental Endowment
Bethel High School Science Club
The Virginia Academy of Science
American Cancer Society
Richmond Area Speleological Society
American Junior Academy of Science
American Association for the Advancement of Science
National Association of Academies of Science
Virginia Tech Chapter, Gamma Sigma Delta
George Jeffers
Ann Hancock Cell Biology & Genetics
Dr. & Mrs. Preston Leake Applied Chemistry
Russell Rowlett
Catesby Jones
Virginia Ellett
Rae Carpenter Mathematics and Statistics Awards
American Society of Naval Engineers - Tidewater Section
Friends of the Virginia Museum of Natural History
Virginia Environmental Business Council
Virginia Peninsula Engineers

Rodney C. Berry (Gwathmey) Chemistry
Dr. Roscoe D. Hughes Genetics
Dr. Smith Shadomy Infectious Diseases
POWER Engineers, Inc. and POWER Foundation
Virginia Psychological Foundation
Virginia Marine Science Consortium
Virginia Sea Grant
Virginia Association of Biology Educators
The Virginia Academy of Science (Botany) Physics and Astronomy Award (George Jeffers NASA donation)
Dorothy Knowlton
Joyce K. Peterson
Franklin D. Kizer
Dean Decker
Don Cottingham
Ertle Thompson
Anonymous Donor

DATES TO REMEMBER

Deadline to apply for Phil Robinson Research Grants	November 1
<p>Deadline for school sponsors to register their schools' with VJAS on Reviewr. (https://my.reviewr.com/site/VJAS_SchoolMembership_2026)</p> <p>Deadline for individual members to contact the VJAS Office (associate.directorvjas@gmail.com) and to register.</p> <p>Note: <i>There is no longer a school or individual membership fee.</i></p>	Recommend Complete by January 15 Students will have problems submitting papers until Sponsors complete the school registration.
<p>Deadline for submitting papers: February 21</p> <p>Note: <i>Students with papers accepted are expected to present at the Symposium. Students not asked to present their papers are invited as participants to the Annual Meeting.</i></p>	All papers and entry forms (i.e. mentor forms, officer applications, letters of recommendation) must be submitted by February 21.
<p>Deadline for the following applications and scholarships:</p> <ul style="list-style-type: none"> • VJAS Officers • Honor Award Applications • Scholarships (VEE, Bethel, etc.) 	February 21
Deadline for students to edit submission and sponsors' review. Sponsors confirm submitted papers	All papers must clear Sponsor's Review by March 3
Deadline for sponsors to submit one payment for all of their students' (\$35 per paper) application fees. Payment link will be sent to sponsors.	March 24
Notification of Accepted Presenters	Check website (www.vjas.org) March 26
<p>Deadline for sponsors to:</p> <ol style="list-style-type: none"> 1. notify the VJAS Office of any student(s) that cannot participate. 2. notify the VJAS Office of any name or paper title corrections. 3. register with the host institution for housing, food, etc (registration link will be shared in March). 	By email to the VJAS Associate Director by April 19 (end of day)
<p>VJAS Research Symposium</p> <ul style="list-style-type: none"> • Student Presentations <ul style="list-style-type: none"> ◦ In-Person at Hampden-Sydney College • Jeffers Memorial Lecture and Symposium: <ul style="list-style-type: none"> ◦ In-Person at Hampden-Sydney College • Awards Ceremony: Virtual 	<p>Jeffers Memorial Lecture: In-person Saturday, May 2</p> <p>Symposium: In-person Saturday, May 2</p> <p>Awards Ceremony: Virtual May 18, 2026 @ 7PM</p>

VJAS HANDBOOK REVISIONS

Original Handbook, 1963	Marc Salzberg Norfolk Academy
Second Edition, 1965	Clyde Kelley Pres. VJAS 1965-66 Churchland High School
Third Edition, 1968	Jack Woodside Pres. VJAS 1968-69 W.T. Woodson High School
Fourth Edition, 1970	Debbie Meloy Pres. VJAS 1970-71 W.T. Woodson High School
Fifth Edition, 1972	Frank Key Pres. VJAS 1972-73 Liberty High School
Sixth Edition, 1975	Bruce Marton Pres. VJAS 1975-76 Wakefield High School
Seventh Edition, 1976	Beau Farmer Vice-Pres. VJAS 1977-78 Pulaski County High School
Eighth Edition, 1982	Christopher-Lee Shawn Bloodworth Vice-Pres. VJAS 1981-82 Manor High School
Ninth Edition, 1987	VJAS Committee
Tenth Edition, 1992	VJAS Committee
Eleventh Edition, 1995	VJAS Committee
Twelfth Edition, 1996	VJAS Committee
Thirteenth Edition, 2000	VJAS Committee
Fourteenth Edition, 2001 - Present Reviewed Annually	VJAS Committee

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:

- (1) Meet Virginia's Standards of Learning
- (2) Encourage the development of practices used by scientists, engineers, and mathematicians by supporting students' pursuit of research and research skills.
- (3) Develop leadership qualities in students
- (4) Encourage the pursuit of careers in science, mathematics, and applied fields.
- (5) Fostering fellowship between the Virginia Junior Academy of Science (VJAS) and the Virginia Academy of Science (VAS)

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. An 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 associations' 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 the 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 the 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. WE continued to grow virtually through a pandemic, to a hybrid, to a heterogeneous blended meeting with virtual students, virtual judges, in-person students, and in-person judges. VJAS continues to raise its bar.

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

Mr. H. J. Davis	1941-47
Mr. F. G. Lankford	1947-49
Dr. Boyd Harshbarger	1949
Mr. B. W. Cooper & Mr. Floyd S. Andrews	1950
Mr. Grover Everett	1951
Mrs. Thelma C. Heatwole	1952-60
Dr. W. W. Scott	1960-64
Dr. E. L. Wisman	1964-72
Dr. Lee Anthony	1972-75
Dr. John L. Hess	1975-78
Dr. A. B. Neimeyer, Jr.	1978-80
Dr. R. Dean Decker	1980-92
Mr. Donald R. Cottingham	1992-97
Dr. Eugene Maurakis, Associate Director	1994-95
Dr. R. Dean Decker & Mr. Donald R. Cottingham	1997-98
Dr. R. Dean Decker & Mr. Donald R. Cottingham Ms. Susan Booth, Associate Director	1998-99
Dr. R. Dean Decker & Ms. Susan Booth	1999-2000
Ms. Susan Booth, Director & VJAS Committee Chair	2000-11
Ms. Susan Booth, Director Ms. Bobbie Whittier, VJAS Committee Chair	2011-13
Ms. Susan Booth, Director & VJAS Committee Chair	2013-14
Ms. Susan Booth, Director & VJAS Committee Chair Dr. David S. Torain II, Associate Director Mr. Se W. Jeong, VJAS Committee Chair	2014-15
Ms. Susan Booth, Director Mr. Se W. Jeong, VJAS Committee Chair	2016-19
Ms. Susan Booth, Director Ms. Robin Curtis, Associate Director Mr. Se W. Jeong, VAS-VJAS Committee Chair Mr. Michael Lovrencic, VAS-VJAS Committee Vice-Chair	2019-24
Ms. Susan Booth, Director & VAS-VJAS Committee Co-Chair Ms. Robin Curtis, Associate Director Mr. Michael Lovrencic, VAS-VJAS Committee Co-Chair	2024-25
Ms. Susan Booth, Director and VAS-VJAS Committee Chair Ms. Robin Curtis, Associate Director	2025-present

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 Virginia students to enter scientific research investigations in competition for awards at the annual VJAS Research Symposium. Virginia students, grades 7 through 12, are eligible to submit their research papers to the Research Symposium. At the same time Virginia students will submit for student officer positions, awards and scholarships. Students with papers accepted are expected to present at the Symposium, students not asked to present their papers are invited as participants to the Symposium. Students whose papers are accepted for presentation will have their papers' **abstracts published in the VJAS Proceedings**. All will be published authors and winners will be recognized at the Awards Ceremony. We hope to encourage young scientists to see this like a professional conference where they join and attend as either presenter or participant but all are attendees.

The VJAS provides a means for Virginia 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. In the virtual component students are encouraged to attend other sessions as if they were at a professional conference.

B. SPONSORS

Recognition is given to all teachers, students, parents, sponsors, administrators, committee members, mentors, and countless other volunteers and leaders who unselfishly spend thousands of hours assisting the participants in conducting research, writing, and processing their papers. The Virginia Junior Academy of Science appreciates 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.
 - **Registers their school with VJAS on Reviewr**, described below in part C. The Head Sponsor needs to share the official school name with students who submit papers. This is the OFFICIAL school name that will be used by VJAS and cannot be altered. If the school name is not visible for selection then contact Robin Curtis, Associate Director (associate.directorvjas@gmail.com) so it can be updated and later accessible in the fields.
 - **Co-signs** (along with Student Sponsor) **applications** for Special Interest Awards and/or Scholarships. All signatures may be electronic.
 - Tracks the number of student entries and the number of students registered for the Symposium. Sponsors will have access to the Reviewr system.
 - Coordinates with the Associate Director on the number of student entries, registrations for the Symposium, and payment of associated fees if the school is paying for students.
 - Accompanies/chaperones those students from the school who will be attending the Research Symposium regardless if in-person, virtual, or hybrid due to students being minors and enabling facilitation of movement of attendees (presenters and participants)
 - o If the Head Sponsor cannot attend the meeting, then the Head Sponsor is responsible for finding another teacher to serve in this important capacity and delegate appropriately while notifying the Associate Director.

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** (as needed) for Special Interest Awards and 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 with the above responsibilities.

3. The **Officer Sponsor** is the teacher that advises and encourages the current Student Officer(s) of the VJAS from their school. The responsibilities are:
- To serve a one-year membership with the VJAS Leaders.
 - To facilitate the officer(s) attendance at VJAS meetings and, if necessary, the Research Symposium
 - To participate in the work of the Committee by attending VJAS meetings and supporting the activities of the officers.
 - To delegate an adult that can support the student officer if the Officer Sponsor is unable.

C. HOW TO PARTICIPATE: MEMBERSHIP

1. **Types of Membership.** Two types of membership in the VJAS are available:
- a. **School Membership:**
- This is open to any secondary, middle, or high school (grades 7 through 12) in Virginia. This type of membership is free and mandatory for any school who has student participation in VJAS.
 - The **Head Sponsor** of the school is responsible for registering their school in Reviewr by January 15. Upon registering the school, the school name populates into the Reviewr paper submission. If the school is not registered the student will not see the school and will not be able to be linked to the school.
- b. **Individual Membership:**
- This membership category is normally intended for homeschooled students (grades 7 through 12) in Virginia. In addition, a student (in grades 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 if they are the only one from that school. It is encouraged that if more than one student is interested that an adult sponsor is willing to support these efforts
 - o The **parent/guardian of the student** must be listed as the **legally responsible party** on the Membership Registration. 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 Registration that is due January 15. This submission process is to be completed using the Reviewr platform.
 - o The parent/guardian should also list a **Student Sponsor** (see description under Sponsors) on the Membership Registration 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 advise

the student properly. With an appropriate background, the parent of a homeschooled student could serve as the student sponsor.

o Individual Memberships are completed during the paper submission processes using this link: https://my.reviewr.com/site/VJAS_Application_2026

- 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," 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 with your teacher/science department early in the school year to see whether your school intends to participate in VJAS. **The parent/guardian (or Student Sponsor) must accompany / chaperone any student attending the Research Symposium.**

2. **Membership Notes.**

- a. **The Membership Applications** are available and submitted through the Reviewr platform (https://my.reviewr.com/site/VJAS_SchoolMembership_2026).

School and Individual members are encouraged to register by the January 15 deadline to avoid delays in the paper submission process. This also will ensure that all School Head Sponsors and all parents/guardians of Individual Members will receive Sponsor Updates 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 membership certificate will be issued from the VJAS office upon request.

3. **Application Fee and Symposium Registration.**

The paper submission deadline for the current year is **February 21**. Invoices will be sent to the head sponsor. An application fee is required for each submitted paper and is due March 24. **If paying by credit card, the charge from PayPal will appear on the credit card statement as 'research'**. Please tell your students to inform parents to avoid contested charges from parents.

\$35 per paper. If a student submits multiple different projects for consideration to the same Symposium, the \$35 fee is charged only once.

- This is the paper submission fee. Students with papers accepted are expected to present at the Symposium, students not asked to present their papers are invited as participants to the Symposium. We hope to encourage young scientists to see this like a professional conference where they join and attend as either presenter or participant but all are attendees.

- Member Schools submit a single check (single payment) for all the entry fees received from the students from its school. Schools are responsible for collecting student monies and submitting a single payment to VJAS. A Symposium Registration fee is required for each submitted paper and is due March 24. Be sure to inform students to check that school is paying even if the school is collecting payment.
- The parent/guardian of a Home school Member should pay online with a credit card or check using the Reviewr site. An application fee is required for each submitted paper and is due March 24.
- Students will register for the Symposium by April 19. This registration will confirm in-person attendance. For in-person attendance, this will include registration with the host institution for Jeffers luncheon.
- **The application fee is separate and apart from any fees charged by the host institution for food, housing, etc.**
- **Application fees are non-refundable as they support the organization's annual management of the symposium.**

III. CATEGORIES

The VJAS provides competition in scientific research for students in grades 7 through 12.

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 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.
- Students must collect the data for their project in whole or in part. If using citizen science databases, students must have contributed to the collection of the data. The exception to this are certain statistics and math projects. Regardless of the ultimate source of the data, papers must be entered into the appropriate category.
- Citizen science projects data sources must be listed in the non peer reviewed section of literature cited.

A. MIDDLE SCHOOL CATEGORIES

- **For Grades 7 and 8** (Grades 9-12 are not eligible to enter these categories.)
 - **Category codes are two letters.**
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 #6).

2. **CHEMICAL SCIENCE (CS)** – The study of matter, its properties, and the changes it undergoes.
3. **COMPUTATIONAL BIOLOGY (CB)** - Using techniques of computer science and mathematics as they relate to biological systems. This includes the development and application of data-analytical and theoretical methods, mathematical modeling and computational simulation techniques to the study of biological systems. Projects using artificial intelligence must be included in this category.
4. **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 #9).
5. **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 relationship 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.
6. **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.**
7. **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.
8. **MICROBIOLOGY (MB)** – The study of microorganisms (bacteria, protozoans, protists, algae, and fungi). This includes the studies of cells, cellular processes, and genetics as they pertain to microorganisms.
9. **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).

10. **PLANT SCIENCES (PS)** - The study of plants and plant life. If the study involves plants with respect to environmental issues, then the project belongs in Ecology and Earth Sciences. This includes the studies of cells, cellular processes, and genetics as they pertain to plants.

B. HIGH SCHOOL CATEGORIES

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

11. **BOTANY (BOT)** – The study of plants, plant cells, and plant genetics. This does not include the study of microorganisms, cellular processes, or biochemistry (see #18).

12. **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 #18).

13. **COMPUTATIONAL BIOLOGY (COM)** - Using techniques of computer science and mathematics as they relate to biological systems. This includes the development and application of data-analytical and theoretical methods, mathematical modeling and computational simulation techniques to the study of biological systems. Projects using artificial intelligence must be included in this category.

14. **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 relationship 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.

15. **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 #19).

16. **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.

17. **MEDICINE & HEALTH (MDH)** – The study of the various sciences related to structure, function, and diseases of humans and laboratory animals. Projects using extensive computational methods or deep learning are best represented in the Computational Biology category.

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

19. **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 #12).

20. **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.

21. **STATISTICAL ANALYSIS & INFERENCES (SAI)** – Using 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.

22. **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 #18). This category does not include human behavior (see #20).

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/or presenting someone else's work as his/her own.

Plagiarism is the act of taking someone else's ideas or work and passing them off as on one's own (Oxford English Dictionary). The VJAS committee and the VAS strongly believe that every researcher needs to act with integrity in reporting and presenting their work. Ideas taken from other sources not originating from the researcher must be properly credited. The expectation is that authors' text is to be their work and not derived from other sources. This includes the use of AI (artificial intelligence) to write any portion of the research paper. Any paper found to be plagiarized will be disqualified and the sponsor will be contacted.

Multiple Authored Projects. The VJAS requires each participant to work independently unless engaged in a joint project with no more than three additional participants. All authors must be residents of Virginia. If a multiple-authored paper is accepted for presentation, all authors must attend the Symposium and participate in the oral presentation. The \$35 paper submission fee is paid per paper, not per student. The team leader should ensure that the \$35 fee is paid for the team. Students who are members of a team are responsible for correctly registering in Reviewr. If they do not register, their name may not be included as authors.

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). Acts as a liaison among VJAS and the students. 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 (whether in a traditional school setting, home-schooled, or virtual-schooled) who worked in a research facility (in-person or virtual) or received significant help from a professional other than their teacher (or instructor) must complete and submit the **Mentor and/or Research Facility Form**. This includes working in (or collaborating with) 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 submit on Reviewr. The student submission will not be complete until the Mentor and/or Research Facility Form is uploaded to Reviewr by the student applicant. If unsure if this form is required, it should be completed.

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. A **simple experiment** using readily available materials in an ingenious fashion may indicate higher capabilities than a complex subject that is neither well designed nor understood.
4. 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 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 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.

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. This money will NOT cover travel expenses OR materials schools normally have. Upon completion of the research, these materials become the school's property. 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 money must be returned to the Phil Robinson Research Fund. It is up to the sponsor receiving these funds to guide the students through the process and if they decide not to attend to reimburse the Academy. If the sponsor does not do this then, it may lead to not receiving funds in the future.

V. REGULATIONS AND CERTIFICATIONS FOR RESEARCH

Certain types of research require that special and designated regulations are 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. If these sections are not completed the project will be disqualified.

A. VERTEBRATE ANIMAL EXPERIMENTS

The basic aim of experiments involving vertebrate animals is to understand 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 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 involve 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 per 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 studying 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. The IRB should include a teacher, school counselor or psychologist, and school administrator (or equivalent individuals in similar positions). The [VJAS Human Subject form](#) must be uploaded with the paper in Reviewr.
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. Before 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 decline or 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 include:
 - a. 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.
 - b. The investigator must agree to answer all of the questions posed by the participants.
 - c. 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 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 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 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)*.

1. All research involving recombinant DNA technology must be carried out per 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 before the student receives 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). **Projects that do not clearly state the use of E-Coli K-12 strain will be disqualified.**
2. Please note that we **automatically disqualify any projects whose research focus is mold or mildew growth**, even if an experiment is discarded at the first sight of growth. **This restriction does not include projects focusing on slime molds.** Projects involving slime molds are acceptable.

3. 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.
4. 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.
5. 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. Students who received assistance from a mentor or worked in a research facility must indicate this on the VJAS Mentor and/or Research Facility Form. This includes help from a parent, family friend, or anyone other than a teacher. The mentored project checkbox must be selected in Reviewr. The student must then enter the mentor's name and email address in Reviewr, which will trigger a form to be sent to the mentor. The student's submission is incomplete until the mentor submits this form. **Incomplete submissions will result in disqualification.**
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 (in-person or virtual) or received significant help from a professional other than their teacher (or instructor)"

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.

1. LENGTH.

- a. Fourteen-page total limit.
 - i. The text (Abstract, Introduction, Methods and Materials, Results, Discussion, Conclusion, Literature Cited, Appendix (optional)) should be no more than a maximum of 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 data analysis.

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.
- 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. 4.)

- a) In-Text Citations. All references must be properly cited in the paper using American Psychological Association (APA) formatting. 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. The correct way to write a scientific name, according to [binomial nomenclature](#), is to italicize both the genus and species names, with the genus name capitalized and the species name in lowercase. For example, *Homo sapiens* is the correct way to write the scientific name for humans. If abbreviated it would appear as *H. sapiens*. In most scientific disciplines, papers have traditionally been written in the third person, but, more recently, the first person has also been used. The study results 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 with 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.
- 5. Plagiarism and Research Integrity.** Plagiarism is the act of taking someone else's ideas or work and passing them off as on one's own (Oxford English Dictionary). The VJAS committee and the VAS strongly believe that every researcher needs to act with integrity in reporting and presenting their work. Ideas taken from other sources not originating from the researcher must be properly credited. The expectation is that authors' text is to be their work and not derived from other sources. This includes the use of AI (artificial intelligence) to write any portion of the research paper. Any paper found to be plagiarized will be disqualified and the sponsor contacted.

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.) **Do not include a Title Page. Do not include Acknowledgements.**

- 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 paper part. The fourteen (14) allowable text pages begin with this page.**
- 2. INTRODUCTION.** The introduction includes a brief review of current and related literature and explains the writer's interest in the subject. Additionally, it should contain the problem, concise objectives, identification of variables, and the hypothesis.

3. **MATERIALS AND METHODS.** This section explains the equipment and supplies used, the methods employed, and the safety guidelines followed in the research. The materials used should be incorporated in the description of the procedures rather than in a 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. Please do not make lists. The VJAS Human Subject form will be sent out through Reviewr upon student registration in Reviewr. The completed form needs to be uploaded with the paper in Reviewr.

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 from 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:
- Numerical data (charts or tables) and/or pictorial data (graphs, pictures, and/or photographs) which are appropriately titled and have the variables clearly labeled;
 - 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 experiment's success, possible procedural improvements, and suggestions for future scientific studies may also be included. Logic and applying 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, or a work cited. This section lists all books, publications, and communications from which significant materials were **cited** in the paper. *If not done properly may lead to disqualification. Please check the APA guidelines for Literature Cited.*
- 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 "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 know 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, .
 - c. Format and Style.

- i. The citations are to be listed (divided) into two sections: Peer-reviewed and non-peer-reviewed.
 - ii. Middle school papers (grades 7-8) will be accepted in MLA and APA citation formats. However, we will only accept APA citation format for high school papers (grades 9-12). See the [American Psychological Association](#) for guidance on format.
 - 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.
 - v. **For an example Literature Cited see any of the completed papers listed beginning on page 256 of the [2024 VJAS Proceedings](#).**
- d. Literature Cited is the last component of the paper (occurring on page 14 or before).
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.

C. PAPER SUBMISSION AND ENTRY FEES

Student papers, the appropriate entry form, and the appropriate \$35 paper submission fee must be completed and paid online via Reviewr by February 21. Submission fees must be paid at the time of submission. Authors must be residents of Virginia. If paying by P.O. or check, the P.O. # or check # needs to be entered in the payment information in Reviewr. Payment must then be sent to the Associate Director, VJAS. Instructions for using the Reviewr event site may be found at: <https://vjas.org/paper-submission-membership--reviewr.html>.

D. PAPER PROCESSING

• Upon Submission in Reviewr

Immediately following the February 21 paper submission deadline, sponsors will have until March 3, to review and verify their students' submissions. During this period, students with completed submissions can edit mistakes uncovered by their sponsor.

Following March 3, a group including the Director, staff, and Committee members and leaders screens the papers following the **DISQUALIFICATION LIST located in the appendix**. Students will be notified of why their papers were DQ'd in after the Awards ceremony following the Symposium.

• Processing and Screening

Papers will be distributed to readers for evaluation. The list of presenters is determined based on the readers' evaluations and available spots to be filled in each category. In categories with more than one section, papers will be distributed

into sections. Any special requests for presentation times must be submitted by the sponsor by May 9, 2026. Once the program is published the schedule is final.

- **Judging**

Each presentation room will typically have one head judge and up to two additional judges. The judges read the papers before 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 the papers are presented, the judges complete their evaluations, rank their scores, and select the winners. Winners are then verified by the VJAS Director. 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 not contest the judges' results.

- **Returning Papers**

Disqualified papers, Readers' comments, and judges' scores will be released (if available) directly to the sponsors/students via Reviewr after the conclusion of the VJAS Awards Ceremony following the Symposium. Sponsors will not be able to screen evaluation comments before their release to students. Papers that are disqualified or that are not accepted for presentation can be upgraded and submitted in subsequent years.

E. 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 cannot 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 (in-person only).
 - c. General Research Symposium information.
3. **Special Interest Awards.** Application is made by completing the appropriate application on Reviewr during the paper submission process. **Please review these awards in the VJAS Handbook and apply to those awards that relate to**

your project topic. If you randomly select all then you may be disqualified from all.

4. **Scholarship Applications.** Application is made by completing the appropriate application on Reviewr during the paper submission process.
5. **Confirmation of Participation.** Sponsors should *confirm* the participation of all their accepted students by email with the VJAS office and notify the Office of any student(s) that cannot participate by **April 25** with requests for changes by May 9. After the final program is published, it is final. (*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. Students who cannot present or whose paper was not accepted for presentation are attendees and should come to the Symposium to watch presentations and participate in other day-of event programs.

F. 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. **Presentation slides should be numbered.**

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. Five minutes are allowed between presentations for the next speaker to prepare. Do not have any visuals with your presentation apart from the pictures and images in the document.

Videotaping in any form (this includes recording when 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 participating in VJAS events or submitting materials to VJAS, participants grant the Virginia Junior Academy of Science (VJAS) full rights to use, reproduce, and publish any photographs, video, or digital images taken or provided in connection with VJAS activities for educational, promotional, and publication purposes, in print or electronic formats, without further consent or compensation.

Presentation Format.

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 to associate-directorvjas@gmail.com before the meeting begins.

Technology.

The presentation should be supported by appropriate visual aids, such as a PowerPoint or some LCD/Computer-generated presentation material.

If there are additions to the paper since its submission, these should be included in the presentation. **Ancillary materials (such as models) 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 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. For in person presentations, 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.

G. 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 (as a MS WORD DOCUMENT). The abstract will be uploaded as a separate document during the paper submission process. These abstracts will be used in the **VJAS Proceedings**.

VII. AWARDS FOR EXCELLENCE IN STUDENT RESEARCH

Students who present papers at the Symposium are eligible to win awards and scholarships.

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. Not all awards are given in each category.

Categories:

Middle School (Grades 7 and 8)

Animal & Human Sciences
Chemical Science
Computational Biology
Ecology & Earth Sciences
Engineering & Technology
Human Behavior
Mathematics: Patterns & Relationships
Microbiology
Physical Science & Astronomy
Plant Science

High School (Grades 9 – 12)

Botany
Chemistry
Computational Biology
Engineering
Environmental & Earth Science
Mathematics: Theoretical & Modeling
Medicine & Health
Microbiology & Cell Biology
Physics & Astronomy
Psychology
Statistical Analysis & Inferences
Zoology

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 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 before, during, or after the Research Symposium, doing so will result in disqualification.

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 have the right to decide whether a) the two (or more) section judges meet together and decide on 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.

VIRGINIA PENINSULA ENGINEERS ENGINEERING AWARD

Description: A certificate is given for the best paper in the field of Engineering by the Virginia Peninsula Engineers.

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.

PHYSICS AND ASTRONOMY AWARD

Description: Given for outstanding research in physics and astronomy.

Procedure: The section judges of Physics and Astronomy will select the best Physics and Astronomy paper to receive this award.

PSYCHOLOGY AWARD

Description: Given for outstanding research in psychology.

Procedure: The section judges of Psychology will select the best Psychology paper(s).

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 before 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 by the Symposium registration date. 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 February 21.

A student must present their 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 establish the Science Museum of Virginia finally.

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 winning paper is selected 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 winning paper is selected 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 winning paper is selected by the Gamma Sigma Delta Award judges based on the written paper.

D. VJAS HONOR AWARDS

These are the highest awards for the Virginia Junior Academy of Science. 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 a 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.

Middle School Honor Awards for the Best Projects

DOROTHY KNOWLTON AWARD

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, and Microbiology middle school sections. The winner(s) is (are) given a certificate(s).

JOYCE K PETERSON AWARD

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, 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, and Physical Science & Astronomy and Mathematics middle school sections. The winner(s) is (are) given a certificate(s).

High School Honor Awards for Best Projects

JONES/ELLETT 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. The 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, Sponsored by VAS

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 winner is the first ranked project. Alternates are the second, third, and fourth ranked projects.

Attendance at American Junior Academy of Science (AJAS):

The AJAS experience, referring to the [American Junior Academy of Science](#), is a national honor society recognizing outstanding high school student researchers in the United States. It's an annual event held in conjunction with the American Association for the Advancement of Science (AAAS) meeting. The experience allows students to interact with leading scientists, engage in hands-on activities, and present their research. It emphasizes mentorship and collaboration over competition, fostering a community of young scientists.

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 must 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 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 winner's expenses, followed by the alternates.

ERTLE THOMPSON AJAS FELLOWSHIPS 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 winner(s) selected as the VJAS Delegate(s) 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.

Award for Student's School Sponsor

DR. R. DEAN DECKER HONORARIUM AWARD

Description: The Dr. R. Dean Decker Honorarium award will go to the teacher/sponsor of the one top student winner of the VAS Best Research Award. The money can be used 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.

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, VJAS Leader, or a member of the VAS may make Nominations. Nominations and supporting materials will be sent to the VJAS Director before 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.

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 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 high school completion.

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 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 as a VJAS teacher sponsor.

- 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 recipient's professional development by providing the funds needed to attend the annual VAST meeting. The maximum amount of the award is based on available funding.

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 will be used for professional development, and the recipient will propose a professional development activity to the Director of the VJAS. The maximum amount of the award is based on available funding. 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 the VJAS Best Research Paper Award winner.

Criteria:

- The recipient is a teacher and is active with the VJAS.
- Funds will be used to support the professional development of the teacher-sponsor of the VJAS Best Research Paper (Jones/Ellett Award) winner to attend professional development events in Virginia at the discretion of the VJAS Committee. The maximum award amount is based on available funding.

VIII. SCHOLARSHIPS

Scholarships must be applied for before 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 papers 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 **February 21**.

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, Grade 12

This \$5,000 college scholarship may be awarded to the 12th-grade 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 scholarship must be applied for and is decided by a special set of judges. The payment shall only be available to students during their first year of college. Students must provide VJAS with proof of attendance no later than November of their first year in college. Students may choose to have payment made directly to the university or to the student. **Failure to provide the requisite evidence will result in the forfeiture of the scholarship. No one student (past or current) may win both the Henry W. Mackenzie and Francis and Sydney Lewis scholarships.**

The Henry W. MacKenzie, Jr. Environmental Scholarship, Grade 12

This \$5,000 college scholarship may be awarded to the 12th-grade 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.

The scholarship must be applied for and is decided by a special set of judges. The payment shall only be available to students during their first year of college. Students must provide VJAS with proof of attendance no later than November of their first year in college. Students may choose to have payment made directly to the university or to the student. **Failure to provide the requisite evidence will result in the forfeiture of the scholarship. No one student (past or current) may win both the Henry W. Mackenzie and Francis and Sydney Lewis scholarships.**

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 are 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.

Once the application is submitted, the selection process is two steps. First, applicants present at the VJAS Symposium. Second, applicants will present (at a separate time) to a special panel of judges. These judges will decide the scholarship recipient based on the application and presentation. The scholarship recipients will be announced at the awards presentation. VJAS will notify VEE in June of the recipients. The payment shall only be available to the student during their first year of college. Students must provide VJAS with proof of attendance no later than November of their first year in college. Students may choose to have payment made directly to the university or to the student. Failure to provide the requisite evidence will result in the forfeiture of the scholarship. No one student (past or current) may win both the Henry W. Mackenzie and Francis and Sydney Lewis scholarships.

Criteria: The recipient must be a Virginia resident enrolled in an accredited public or private high school (grade 12 only) 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.

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. No one student (past or current) may win both the Henry W. Mackenzie and Francis and Sydney Lewis scholarships.** 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.

BETHEL HIGH SCHOOL SCHOLARSHIP

Description: This scholarship of \$1000 is awarded to a student (12 grader 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 during the first year. The student must give the VJAS Director proof of enrollment for the first semester and evidence of satisfactory progress from the first semester. 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. The student winner must notify the VJAS Director when they are ready to use the scholarship.

IX. OPERATION OF THE VJAS

A. VJAS COMMITTEE

The operation of the VJAS is the responsibility of the VJAS Director and Associate Director. A volunteer committee appointed by the VAS who works within the framework of its policies.

The VJAS Leaders includes the VJAS Director, VJAS Associate Director, VAS-VJAS Committee Chair, VJAS Committee Vice-Chair, teachers, sponsors, and the Junior Academy officers who represent students. VJAS Leaders are assigned to perform the numerous tasks of the VJAS. These assignments may occur in areas of fundraising, VJAS Handbook revisions, Reader Chairs, Section Chairs, *VJAS Voice (VJAS Newsletter)*, Graduate Records, *The Proceedings*, Publicity, Local Arrangements, Special Meeting Functions, VJAS Arrangements, and subcommittee appointments. VJAS Leaders who fail to attend more than two consecutive meetings will be removed. Leaders may be reinstated at the discretion of the VJAS Committee Chair or the VJAS Director.

The VJAS Committee with the VJAS Leaders meet on a Saturday in January and June (unless otherwise notified) to conduct the business of the VJAS.

B. RESEARCH SYMPOSIUM

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. At this time due to increased costs for in person meetings we are looking at in person, hybrid, and virtual formats. Each year notification of the meeting format will be announced by September preceding the May Symposium.

The focus of the Research Symposium is the presentation of accepted research papers submitted by VJAS members.

Anyone interested in the activities of the VJAS may attend the Research Symposium. There is a non-reimbursable registration fee for the meeting that is announced on the VJAS website before the Research Symposium. Everyone attending is expected to register. .

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

OVERVIEW

Students 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, Communication Liaisons, and on occasion, Regional Directors. These officers, selected from and by the statewide student membership of the VJAS, work with the VJAS Team and serve under the direction of the VJAS Director and VJAS Leader Student Officer 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 in all meetings, registering, and staying onsite (or online) at all times as the designated chaperone.

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 for the office of President must be current officers in good standing.
- c. Candidates must have submitted a research paper for competition at the Research Symposium for the current year and must plan to submit one for the year they hold officer positions.
- d. Officers are expected to attend VJAS Student Leader Meetings (summer and winter), and the annual Research Symposium. An adult sponsor must accompany the officer to the summer and winter meetings - whether that be the teacher sponsor from school OR in lieu, a parent. Missing more than one meeting will result in an student officer being removed from office.
- e. Student officers and their sponsors are also expected to attend monthly calls to confer with the Student President on student engagement, VJAS Voice, and membership outreach issues.

If any of these requirements are not met, then the student officer may have to resign from 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 with the VJAS Leaders, which meets typically on the fourth Saturdays in June and January (unless otherwise notified). It is also the sponsor's responsibility to participate in the work of the Committee by attending meetings and supporting the activities of the officers.

OFFICER DUTIES

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

The **President** is a rising 11th or 12th grader and 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 Leadership. The Office of President candidate must be a current officer.

The **Vice-President** is a rising 11th or 12th grader and 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** is a rising 11th or 12th grader and records the minutes of the VJAS Leaders meetings and the Annual Meeting and submits them in writing to the VJAS Director and the VJAS Committee.

The **Editor-in-Chief** is a rising 10th, 11th, or 12th grader and 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 members or sponsors for opinions, interviews, or help.

The **Student Communication Liaisons** is a rising 10th, 11th, or 12th grader and 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 appearances, website updates, and social media to inform schools of the VJAS policies, positions, and opportunities. They are also responsible for maintaining a social media presence for VJAS, closely supervised.

APPLICATIONS FOR OFFICE

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. The application must be completed in Reviewr by February 21.

In the event that multiple students apply for the same officer position, officer candidates will be assigned duties at the discretion of the VJAS Director, VJAS Associate 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. The *VJAS Proceedings* will be distributed online. The *Proceedings* may consist of

- Meeting Information
- VJAS Committee Members and Officers
- The list of all award winners
- The abstracts of all presenters at the discretion of the Director
- The complete paper(s) of the project(s) chosen to attend AJAS.

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. Secondly, 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.

The Voice is an online quarterly newsletter produced by the VJAS student officers and is led by a student officer who serves as Editor-in-Chief. It is an entirely student-driven publication designed to encourage student participation in VJAS and inform young scientists of upcoming events and deadlines related to the annual symposium. *The Voice* strives to highlight all the perspectives of VJAS – students, mentors, teachers, and administrators. It is published on the VJAS website and also shared with student sponsors. Please contact the Editor-in-Chief if you would like to contribute to *The Voice* or if you have any questions regarding this publication.

The ***VJAS Style Manual*** complements the VJAS Handbook in guiding students and teachers on how to write an effective scientific research paper in preparation for submission to the VJAS Program. It describes general stylistic expectations as well as descriptions of all the required text components. The manual also outlines strategies to create a succinct but informative oral presentation using a PowerPoint format. Referencing the style manual before starting your research write-up is highly recommended.

E. GENERAL RULES AND CODE OF CONDUCT

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 student 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 acceptance from 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 whether the Symposium is virtual or in-person.

General Rules

1. All students must be chaperoned by their registered sponsors at all times.
2. All sponsors are responsible for their participants.
3. During in-person events, each participant should carry their own personal medical information on them at all times.
4. In the case of an emergency, it is the responsibility of sponsors to ensure their students are notified.
5. During in-person and overnight events, curfews are expected to 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. Students are expected to see other presentations.

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. This includes any rules the host institution has with regard to proper use of electronic media.
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. During in-person events, refrain from intentional damage or defacing of host institution property. Schools are responsible for any damaged 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. At all times, cultivate a harmonious relationship between the VJAS and the host institution. During in-person events, 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

(Abridged - Please reference the full handbook for complete rules and procedures.)

- **All papers must be on the Reviewr platform by February 21.**
- An application fee is required for each paper submitted by a student or team and is due with the paper. The paper submission deadline for the current year is **Friday, February 21**. Invoices are available upon request from the VJAS Office (associate-directorvjas@gmail.com); requests must be made in time to meet the deadline. March 24
 - a. **Members** (students from Member Schools and Home School Members). Each Member School submit a single check (single payment) for all of the application 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 a Home School Member should submit either a check for his/her child's application fee. Contact associate.directorvjas@gmail.com. Payment may also be made online via the Reviewr platform.
- Submit VJAS Special Interest Award Applications, paper, and any other requested material using the Reviewr platform by February 21. Follow instructions exactly.

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).
- 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 font is no smaller than 12 pt. type size using Times New Roman as recommended by APA.
- **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 or a work cited. 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
- Abstract over 1 page
- Total paper length (over 14 pages)
- Footnotes included
- Sponsor submissions verification is missing.
- Student-generated forms reference VJAS without prior approval from the director
- Failure to follow paper writing directions. Provide explanation in the comment box.

SAFETY AND PROCEDURES

- Failure to upload the completed VJAS Human Subject Form to Reviewr(projects with human subjects only)
- E-coli projects: E-coli K-12 strain is not explicitly stated.
- Project violates state or federal laws or is deemed unsafe by the VJAS Director

CITATIONS

- Missing/not included
- Bibliography instead of Literature Cited
- Literature Cited is not separated by Peer-Reviewed and Non-Peer Reviewed

PROPER CERTIFICATION FORMS MISSING OR NOT SIGNED in Reviewr

- Vertebrate
- Human Subject
- Recombinant DNA
- Tissue/Cells
- Pathogenic agents, controlled or toxic substances
- Mentor form

INDIVIDUALITY OF WORK

- Plagiarism
- Overuse of AI Tools

- Other is not listed. Provide explanation.:

iii - Reviewr and Submission Instructions

VJAS uses the Reviewr event site for all paper submissions, membership applications, and payments. Instructions for using the Reviewr event site may be found at:
<https://vjas.org/paper-submission-membership--reviewr.html>.

v - Phil Robinson Research Grant

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 VJAS 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 VJAS 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 multiple and alternative sources 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.

vi. Phil Robinson Research Grant Application

The Phil Robinson Research Grant Application is a Google form. Follow this link to access the Google form: <https://forms.gle/dyPqEuazdXk3fto39>.

vii. Reader's Scoring Rubric (on Review; 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

OVERALL EVALUATION OF PAPER

Good (Invited to present.)-points value 3

Fair (Invited to present, if space.)-points value 2

Poor (Not invited to present.)-points value 1

Constructive comment(s):

Note: If your paper did not make presentation status then you are invited to attend the Symposium to watch other presentations. You will be invited to meet with the director to discuss your paper. Please make changes and resubmit the next cycle for consideration. We hope this has been a positive learning experience.

viii. 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

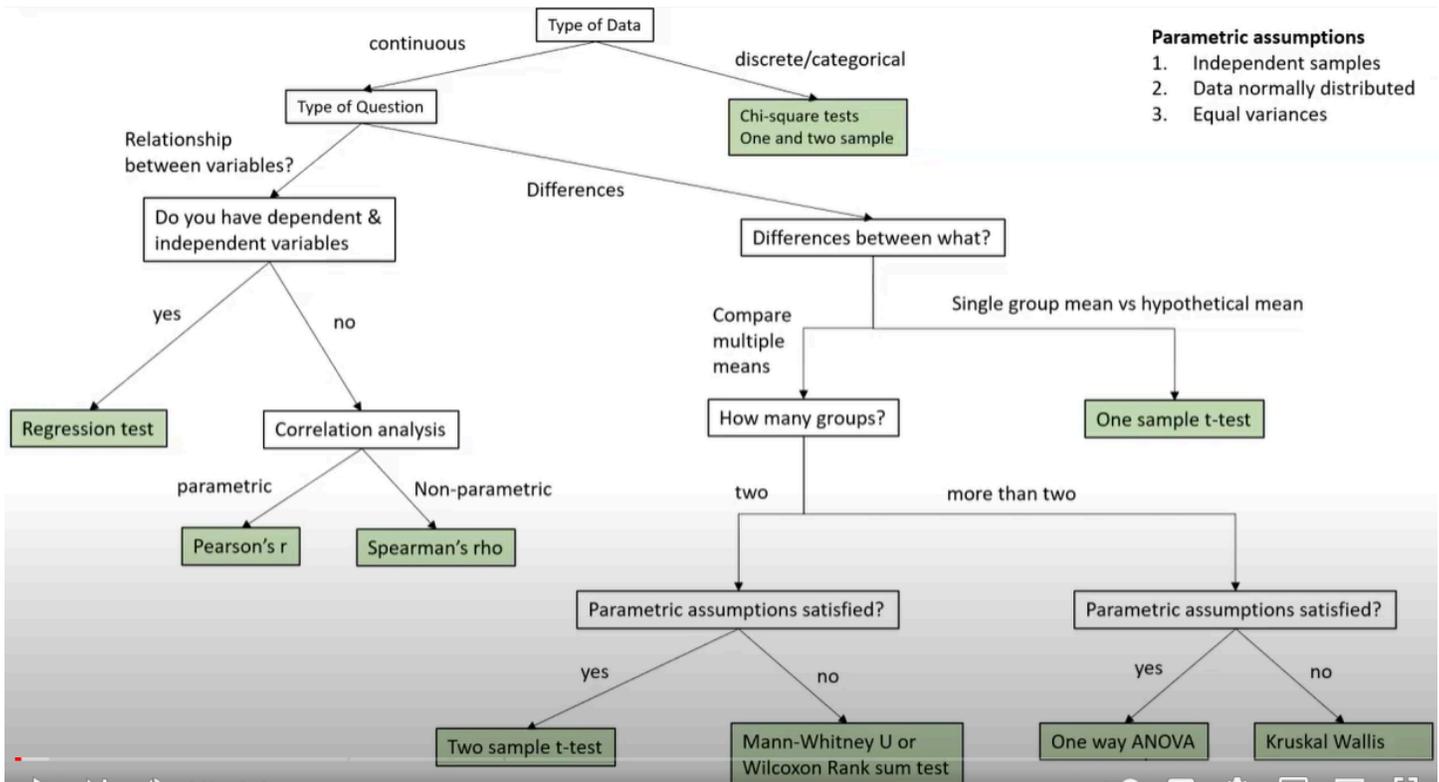
PRESENTATION: Comfortable with communicating information (not reading audiovisuals); engages the audience through eye contact, volume, and pace of presentation; uses visuals that are sufficiently large, attractive, and increase audience’s understanding of the topic; comfortable with using technology;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

III. QUALITY OF RESEARCH

Assesses the Quality of Research of the Project. Look to see if the research addresses a 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 the project; quality of the project in relation to other presenters, e.g. outstanding, good, average, below average (15 points)

IX. Statistics Chart



VJAS Human Subjects Form

Project Title:

Include the text of the informed consent / subject permission form in the space below.

IRB Committee Signatures. This project has been evaluated and judged to have minimal risks to participants.

_____ Signature (Teacher)	_____ Printed Name	_____ Date
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_____ Signature (Counselor or Psychologist)	_____ Printed Name	_____ Date
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_____ Signature (Administrator)	_____ Printed Name	_____ Date
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