



## Show us what you've got!

All across West Virginia, middle and high school students are experimenting in science labs and art classes. They are contemplating mathematics challenges and memorizing charts.

Now, with the introduction of the West Virginia Science and Art Fair, students in RESA Districts I, II, III and IV have an opportunity to show off their knowledge and display their creativity through investigatory and display projects, art exhibits, symposium presentations and Olympiad events. Students may choose to complete investigatory or display projects or art exhibits and to attend the science fair to participate in the Olympiad Events.

The fair is open to students in sixth through 12th grades who attend public, private and home schools and who have not reached the age of 21 on or before October 1, 2013. In addition to individual and team events, there will be school competitions.

Learn more about the application and registration processes and get the full details on project requirements and guidelines by visiting <http://www.wvutech.edu/wvsciencefair>. On the web site, you can download registration forms and other information designed to help students do their best work for the fair.

### INVESTIGATORY PROJECTS

Students are invited to perform experiments and create displays explaining their experiments and the results in the following categories.

- *Behavioral and Social Sciences*
- *Biochemistry and Microbiology*
- *Botany*
- *Chemistry*
- *Computer Science*
- *Earth/Space Sciences/Environmental Sciences*
- *Engineering*
- *Mathematics*
- *Physics*
- *Zoology/Medicine Health/Gerontology*

**Team Project** – Teams of two or three students may work on investigatory projects related to any of the categories listed above.

### DISPLAY PROJECTS

The Display Division recognizes individuals or teams who present displays about a topic of interest to them.

**Individual – Biological Science:** Demonstrate scientific concepts or application of those concepts to a specific problem in biology.

**Individual – Physical Science:** Demonstrate scientific concepts or application of those concepts to a specific problem in the physical sciences

**Team:** Demonstrate scientific biological science or physical science concepts or application of those concepts to a specific problem created by two to three students.

### SYMPOSIUM

The symposium is an oral competition with presentations related to entries in the Investigatory Projects Division or Display Division. Each individual or team will have five minutes to present a chosen topic.

### OLYMPIAD EVENTS

The Olympiad Events are open to any students who register for the West Virginia Science and Art Fair. Students do not have to enter exhibits in the other categories to participate in these events. Registration for these events will be held on the day of the fair.

#### Physical Science Categories

- *Arithmetic by Twos*
- *Astronomy Quiz*
- *Chemistry Crossword Puzzle*
- *Egg Drop*
- *Futuring (Team of 4 or less)*
- *Laser Shoot (Team of 4 or less)*
- *Metric Estimation (Team of 4 or less)*
- *Paper Airplanes*
- *Paper and Pencil Arithmetic*
- *Periodic Table Quiz*
- *Rocks to Riches*
- *Small Barge*
- *Sudoku*
- *Titration Race*
- *What's That?*

#### Biology Categories

- *West Virginia Wildlife*
- *Scavenger Hunt (Teams of 4 or less)*

### ART EXHIBIT

Students may enter original art objects that have scientific themes. Art form may include drawings, paintings, models, sculptures, pottery, mobiles, or other media. These will be judged on artistic merit and adherence to the scientific theme.

**Art objects may be entered in two categories:**

- Two Dimensional Art
- Three Dimensional Art

### For more information please contact

Dr. Mark Jones, (304) 442-3150 or  
Mark.Jones@mail.wvu.edu at  
WVU Tech

November 16, 2013

## EVENTS SCHEDULE

8 a.m.....Students set up Investigatory and Display Projects and Art Exhibits  
 9:30 a.m. .... Symposium  
 10:30 a.m. - 12:30 p.m. .... Investigatory Project Judging  
 12:30 p.m. - 1:30 p.m..... Lunch  
 1:30 p.m. - 4 p.m..... Olympiad Events  
 4 p.m. .... Pack up exhibits  
 4:30 p.m. .... Awards Assembly

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### JUDGING

All judging will be done at the October 16 fair by panels of qualified West Virginians.

### AWARDS

Investigatory Projects, Display Projects, Symposium and Olympiad Events

### Individual and Team Competitions

All students who participate in the West Virginia Science and Art Fair will receive certificates of participation.

First, second, third, fourth and fifth place ribbons will be awarded for Investigatory Projects, Display Projects, the Olympiad and the Symposium.

### School Competition

Schools will be awarded points for winners in each project division and Olympiad event. Plaques will be awarded to the high school and middle school with the most points.

### ART EXHIBITS

For each category, first, second, third, fourth and fifth place ribbons will be awarded.




# West Virginia +SCIENCE+NC<sup>o</sup>⇌E and Art FAIR

## SPONSORS



November 16, 2013

WEST VIRGINIA UNIVERSITY  
 INSTITUTE OF TECHNOLOGY  
 Montgomery, West Virginia



## **WEST VIRGINIA SCIENCE AND ART FAIR**

### **GENERAL INFORMATION**

Fair announcements and applications will be provided to all schools participating in the science fair. Applications should be submitted within two weeks of the fair date (November 16, 2013). However, students may register any time after that date including on the day of the fair.

#### **Who can enter the fair?**

To participate in the fair, a student must:

1. Be in grades 6-12.
2. Not have reached the age of 21 on or before October 1, 2013
3. Attend public, private or home school
4. Live in RESA Districts I, II, III or IV

#### **What can students do at the fair?**

Students can participate in Investigatory Projects, Display Projects, Art Exhibits, Symposium and Olympiad events. While the Investigatory Projects, Display Projects, Art Exhibits and Symposium require advance preparation and work, the Olympiad events are open to any students who qualify under the guidelines listed above.

### **SCHEDULE OF EVENTS**

The West Virginia Science and Art Fair will be held on the campus of West Virginia University, Institute of Technology, in Montgomery.

8 a.m.	Investigatory and Display Projects and Art Exhibits set up
9:30 a.m.	Symposium Division presentations begin
10:30 a.m. – 12:30 p.m.	Judging: Students must be present at their Investigatory Project exhibits during this time, unless they are giving a symposium, to answer judges' questions. If the student is not present, the project may be disqualified.
12:30 p.m. - 1:30 p.m.	Lunch
1:30 p.m. – 4 p.m.	Olympiad Events
4 p.m.	Pack-up all exhibits.
4:30 p.m.	Awards Assembly

(Students do not have to be present to win but someone must pick up their prizes.)

## AWARDS

1. Certificate of Participation  
Every student participating in the Investigatory and Display project divisions will receive a certificate of participation.
2. Investigatory Projects Division- Middle and High School Divisions
  - 1<sup>st</sup> Place Ribbon
  - 2<sup>nd</sup> Place Ribbon
  - 3<sup>rd</sup> Place Ribbon
  - 4<sup>th</sup> Place Ribbon
  - 5<sup>th</sup> Place Ribbon
3. Symposium, Art Exhibits and Display Projects Divisions  
Each Division
  - 1<sup>st</sup> Place Ribbon
  - 2<sup>nd</sup> Place Ribbon
  - 3<sup>rd</sup> Place Ribbon
  - 4<sup>th</sup> Place Ribbon
  - 5<sup>th</sup> Place Ribbon
4. Olympiad Events
  - 1<sup>st</sup> Place Ribbon
  - 2<sup>nd</sup> Place Ribbon
  - 3<sup>rd</sup> Place Ribbon
  - 4<sup>th</sup> Place Ribbon
  - 5<sup>th</sup> Place Ribbon
5. School Competitions

Schools will be awarded points for winners in project divisions and Olympiad event. The high school and middle school with the most points will be awarded plaques.

## OLYMPIAD EVENTS

All students are encouraged to enter these challenging and fun events. It is not necessary that the students have exhibits entered in the fair to participate in these events.

Points will be awarded to the schools to determine the winner of the overall school trophies in Biology and Physical Science for some Olympiad events.

Registration for these events will be held on the day of the fair.

### **Physical Science Categories**

**Arithmetic by Twos:** A timed even to test your skills in arithmetic using binary numbers.

**Astronomy Quiz:** An oral quiz about Astronomy, operated like a spelling bee.

**Chemistry Crossword Puzzle:** Participants will be given crossword puzzles and a periodic chart. Clues for most words in the puzzle will include element numbers whose symbols can be used to spell the answers to the puzzle. Scoring will be based on speed and accuracy.

**Egg Drop:** Objective is to drop a raw egg in a container from approximately the third floor of Orndorff Hall to impact with the concrete of the first floor.

1. Each participating student must certify that the container constructed for the egg is their own work.
2. The container will be constructed prior to the fair and brought to the fair by the participant.
3. The container must fit through an 8-inch PVC pipe and navigate a 45 degree bend in the pipe. The pipe will begin at a 45 degree down angle and after the turn will be vertical.
4. At the end of the fall the participant must remove the egg from the container and demonstrate to the judges that the egg is whole.
5. The container and the egg released from the top must reach the floor as a unit. No other catch mechanisms will be permitted.
6. One egg will be furnished to each contestant to insert in the container prior to the drop.

**Futuring (Team of 4 or Less):** Participants are asked to identify the greatest number of possible alternatives to hypothetical situations.

**Laser Shoot (Team of 4 or Less):** Object is to align the beam from a laser, through optical elements, getting as close as possible to a bulls eye on a stationary target. Time limit per team is 15 minutes.

**Metric Estimation (Team of 4 or less):** Participants are involved in activities, which combine the skills of estimation, measurement, and athletic competition events. Included are such events as straw throw, paper plate throw, cotton ball toss, standing broad jump and trundle wheel relays.

**Paper Airplanes:** Participants will build a paper airplane (typical glider type) from 8 ½" x 11" sheets of paper provided. Scoring will be a measurement from launching point to a landing point.

**Paper and Pencil Arithmetic:** Participants will be given a set of mathematical problems to solve using only paper and pencil. NO calculators will be permitted. Scoring will be based on both speed and accuracy.

**Periodic Table Quiz:** Competition is an oral quiz in which answers are all the names of one of the elements. This will be operated like a spelling bee.

**Rocks to Riches:** Participants will identify as many mineral and rocks as possible in 10 minutes.

**Small Barges:** Participants construct a barge from a piece of aluminum foil. The idea is to form a boat that will support maximum mass. The boat holding the most mass (tile sections) is the winner.

**Sudoku:** The classic logic puzzle that involves arranging numbers in a 9x9 grid so that the numbers 1-9 appear only once in each row, column and 3x3 grid. The winner will be the student who completes the puzzle in the fastest time.

**Titration Race:** Participants have three tries at titrating a standard solution (phenolphthalein indicator). Speed and accuracy count.

**What's that?:** Participants are asked to identify structures, organisms, etc., presented in partial pictures, close-ups, etc. Scoring will combine speed and accuracy.

### **Biology Categories**

**Names of West Virginia Wildlife:** Participants will be asked to identify a variety of plant and animal organisms that are native to West Virginia. The trees, herbaceous plants, insects, birds, reptiles, etc., included may be represented in the practical by the organisms, a picture, footprint or other identifiable characteristics. Field guides and keys may not be used.

**Scavenger Hunt (Teams of 4 or less):** This may be an outdoor event or indoor event, in which participants find biology related objects on their search list within the 30-minute time limit.

## **INVESTIGATORY and DISPLAY PROJECT RULES and JUDGING CRITERIA**

### **FAIR RULES**

The display rules and judging criteria are identical for Investigatory and Display Projects divisions.

1. Project exhibit size is limited to 76 cm deep (front to back), 122 cm wide (side to side), and 274 cm high (floor to top). Any project exceeding these dimensions is oversized and does not qualify for entrance in the fair.
2. Avoid having anything in the display that could be potentially harmful or offensive including:
  - a. Chemicals, including water
  - b. Poisons, drugs, controlled substances
  - c. Dry ice
  - d. Sharp objects, including syringes, needles, pipettes
  - e. Living organisms, including plants

- f. Taxidermy specimens or preserved parts of animals
  - g. Plan material (except paper and cotton material used to build display)
  - h. Flames, highly flammable material
  - i. Human or animal tissues or body fluids
  - j. Hazardous devices (including firearms and ammunition)
3. All photos on the display must have a photo credit.
- a. Most of the photos should be the work of the student; however, photos of the student conducting research may be the work of someone else as long as proper credit is given.
  - b. Photos or other visual presentations depicting vertebrate animals in non-natural condition, including surgical techniques, dissections, necropsies or lab procedures are not permitted.
  - c. Copyrighted photos, including those available on the internet, are not permitted unless the student has written permission from the copyright holder. The written permission should be displayed and/or available to show the judges.
  - d. Any photo deemed offensive by the SRC must be removed from the display
4. No awards, medals, business cards, flags, etc. may be displayed.
5. Each student must assemble his or her exhibit without major outside help, except for transportation and unpacking.
6. 110-volt AC service with 300 watts per project will be provided. Additional power will be at the exhibitor's expense and require:
- a. Prior notification of the rules committee requesting clearance, and
  - b. A safety statement by an adult supervisor.

### **Judging Criteria**

Displays will be judged according to the following criteria:

- Thoroughness 20%
- Skill of Presentation 20%
- Clarity 20%
- Physical Attractive 20%
- Intriguing to Viewers 20%

### **INVESTIGATORY AND DISPLAY PROJECT APPLICATIONS**

Application- Word format (can be downloaded at site)

Application – pdf format (can be downloaded at site)

Applications can be received up to the day of the fair. Students can also register the day of the fair.

Students must complete the application form and submit it with an abstract (150 to 250 words). The abstract should include the title, purpose/application, general findings and conclusion.

PLEASE NOTE: Any project that involves humans, non-human vertebrates, human tissues, pathogenic or potentially pathogenic substances, controlled substances, or recombinant DNA must have approval from the Institutional Review Board (RB) or a Scientific Review Committee (SRC) before the experiment begins. If prior approval is not received, the project will be disqualified immediately. If your school does not have an SRC or IRB, you can have the project reviewed by the SRC for the fair. Contact (304) 442-3358 or (304) 442-3314 for additional information.

The definition of a non-human vertebrate includes any live, non-human mammal, bird, reptile, amphibian (including frogs) and fish. It also includes any non-human mammal embryos or fetuses and reptile and bird eggs within 72 hours of hatching. It includes animals kept as pets, such as dogs, cats and aquarium fish. If you have any questions about whether your animal is vertebrate, contact (304) 442-3358 or (304)-442-3314.

### **INVESTIGATORY PROJECTS**

In this division, students perform an experiment and then create a display explaining what their experiments were about and the results of the experiment.

Projects can be entered in the following categories:

**Behavioral and Social Sciences:** Scientific principles applied to studies of factors affecting human or animal behavior, scientific principles applied to sociological studies.

**Biochemistry and Microbiology:** Chemistry of life processes-molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones, etc. Biology of microorganism-bacteriology, virology, protozoology, fungi, bacterial genetics, yeast, etc.

**Botany:** Agriculture, agronomy, horticulture, forestry, plant biorhythms, palynology, plant anatomy, plant taxonomy, plant physiology, plant pathology, plant genetics, hydroponics, algology, mycology, etc.

**Chemistry:** Physical chemistry, organic chemistry, inorganic chemistry, analytical chemistry, materials, plastics, fuels, pesticides, metallurgy, soil chemistry, etc.

**Computer Science:** Original computer applications, software of a general quantitative or algorithmic nature, etc.

**Earth/Space Sciences/Environmental Sciences:** Geology, geophysics, physical oceanography, meteorology, atmospheric physics, seismology, petroleum, geography, speleology, mineralogy, topography, optical astronomy, radio astronomy, astrophysics, pollution(air, water and land) sources and their control, ecology.



**Engineering:** Civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental engineering, etc. Power transmission and generation, electrics, communications, architecture, bioengineering, lasers, computers, instrumentation, hardware, firmware, and systems software design configuration, construction and testing, etc.

**Mathematics:** Calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability, topology, logic operations research and other topics in pure and applied mathematics

**Physics:** Solid state, optics, acoustics, particle, nuclear, atomic plasma, superconductivity, fluid and gas dynamics, thermodynamics, semiconductors, magnetism, quantum mechanics, biophysics, etc.

**Team Project:** Teams may consist of up to three members. Projects must be of an investigatory nature and may involve any of the above listed categories.

**Zoology/Medicine Health/Gerontology:** Animal genetics, ornithology, ichthyology, herpetology, entomology, animal ecology, anatomy, paleontology, cellular physiology, animal biorhythms, animal husbandry, cytology, histology, animal physiology, neurophysiology, invertebrate biology, diseases and health of humans and animals, dentistry, pharmacology, pathology, ophthalmology, nutrition, sanitation, pediatrics, dermatology, allergies, speech and hearing, aging process in living organisms.

### **DISPLAY PROJECTS**

The Display Division of the fair recognizes individuals or groups who wish to present a display about a topic of interest to them.

The Display Division is divided into three categories:

**Individual- Biological Science** - A demonstration of scientific concepts or of application of those concepts to a specific problem in biology created by a single student.

**Individual – Physical Science**- A demonstration of scientific concepts or of application of those concepts to a specific problem in the physical sciences created by a single student.

**Group**- A demonstration of scientific concepts or application of those concepts to a specific problem created by 2-3 students.

### **SYMPOSIUM DIVISION**

The symposium is an oral competition in which students' presentations are related to an entry in the Investigatory Projects Division or Display Division of the fair.

Each participant (individual or group) will be given five minutes to present a chosen topic. The use of student-generated audio-visual support, such as PowerPoint presentation, graphs, tables, slides, etc., is encouraged.

A standard computer and computer projector will be available in the presentation room. Students should bring their presentation laded on a flash drive. Any other A-V equipment may be provided if the need is indicated on the entry application.

To apply for the symposium, fill out the application and send it in.

All applications will be assigned a time for presentation at the fair registration.

### **Judging Criteria**

The Symposium presentations will be judged according to the following scale:

#### **Content (50%)**

Thoroughness 25%

Topic Mastery 15%

Personal Involvement 10%

#### **Delivery (50%)**

Skill (25%)

Clarity (15%)

Dramatic Value (10%)

### **ART EXHIBIT**

Students may enter any art object that has been created by the student and that has a scientific theme.

Any art form may be entered including drawings, paintings, models, sculptures, pottery, mobiles, or any other media. These will be judged on the basis of artistic merit and adherence to the scientific theme.

### **Categories**

Art objects will be entered in either of two categories:

Two Dimensional

Three Dimensional Art

Applicants should submit a separate application for each art object.

PLEASE NOTE: The only rule for this competition is the artwork must be original, related to science, and produced by the student alone.

WVU Tech

West Virginia Science & Art Fair

General Registration Form

Student's Name \_\_\_\_\_

First

Last

Address \_\_\_\_\_

Street or P.O. Box

City

Zip Code

Home Phone (304) \_\_\_\_\_

Grade (circle one)  5  6  7  8  9  10  11  12

Sex:  Male  Female

Name of School \_\_\_\_\_ County \_\_\_\_\_

Name of Sponsoring Teacher \_\_\_\_\_ School Phone \_\_\_\_\_

Investigatory Project : \_\_\_\_\_

Display Project: \_\_\_\_\_

Symposium: \_\_\_\_\_

Art Exhibit: \_\_\_\_\_

**IMPORTANT:** For team projects, list names and addresses of all members of the team on the back of this form. The group spokesperson's name should appear at the top of this form.

Assistance Received:

Academic by \_\_\_\_\_

Financial by \_\_\_\_\_ Amount \_\_\_\_\_

Equipped by \_\_\_\_\_

This entry must be received by October 9, 2013. A 150-250 word abstract of your project must accompany your application. Send the entry form to Dr. Mark Jones, WVU Institute of Technology, 405 Fayette Pike, Montgomery, WV 25136.