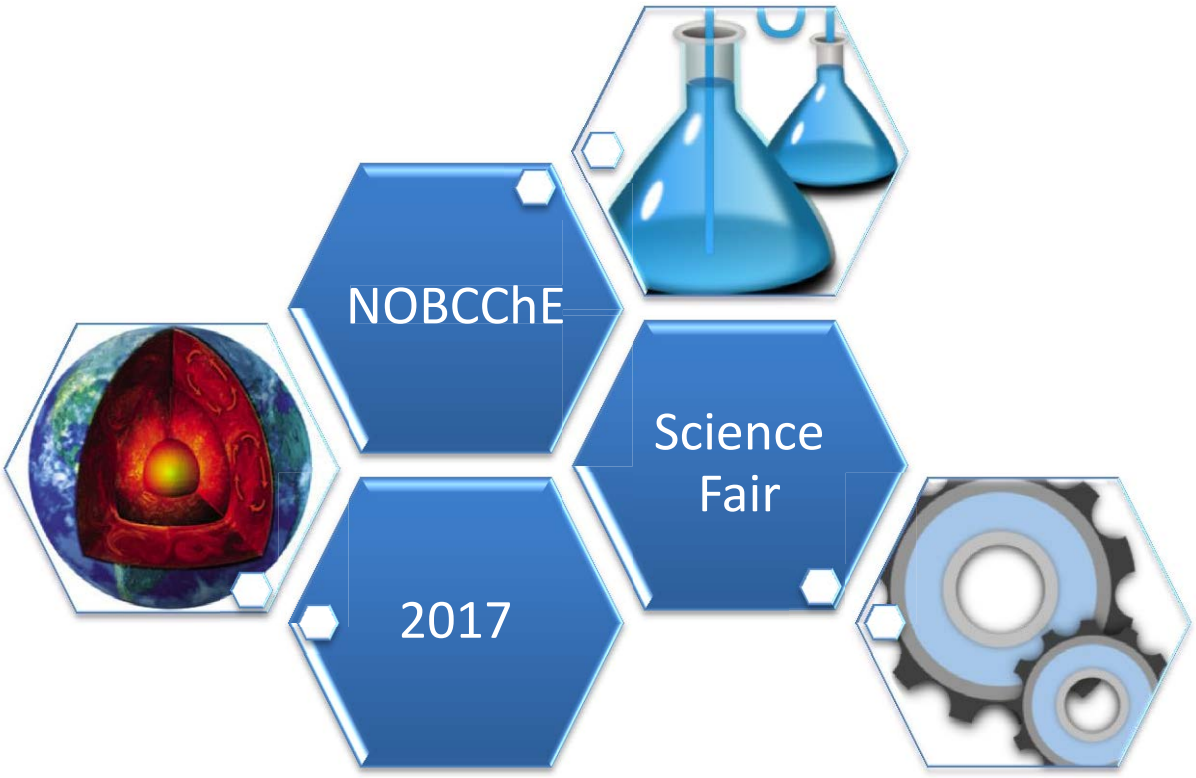

NOBCCHE SCIENCE FAIR

GUIDEBOOK AND RULES

UPDATED FOR FALL 2017

NOBCChE K-12 STEM week

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Introduction

The NOBCChE (National Organization for the Professional Advancement of Black Chemists and Chemical Engineers) Secondary Education Committee is pleased to provide the enclosed details concerning the 2017 Guidelines for secondary school students in the United States. NOBCChE chapters and regions are encouraged to sponsor individual students who will compete for awards and peer recognition. **Please visit our website: www.nobccheSTEMwkd.com for updated information.**

The NOBCChE Science Fair competition is divided into Junior (6th – 8th grades) and Senior (9th - 12th grades) levels. First, second, and third place prizes are awarded in each level for both competitions.

Students entering the 5th grade will be allowed to showcase a science fair project, however they will only receive a certification of participation.

The NOBCChE National Science Fair is a poster competition in which students present an independent completed research project. Each contestant in the Science Fair must demonstrate their ability to conduct a research project by:

- Submitting an abstract of 150 words or less on an individual research project in one of the following **four categories: physical sciences, math & engineering, consumer science, or biological sciences**
- Presenting the results of the research in a poster format, including answering questions from judges

Posters are judged by STEM professionals and subject matter experts. First, second, and third place medals are awarded in each division (Middle School and High School). There will also be specialty awards for local students (Midwest Region) and People's Choice (online voting).

The Science Fair mentor (aka Chaperone) is responsible for registering their student and emailing the necessary Parent Consent forms to the NOBCChE Secondary Educational Committee Chair.

Deadlines and Requirements

- ✓ 150 word abstract due at registration
- ✓ Science fair registration due by October 23rd
- ✓ Parent consent form due by October 23rd
- ✓ Report submission (by email) due by September 13th. Bring hardcopy to event if desired.
- ✓ Poster exhibit on November 1, 2017

General Instructions for Chaperones

Please read the enclosed information carefully as they contain new updates from previous years

- Adult chaperones are responsible for the general welfare, safety, lodging and meals for their students and must ensure that students conduct themselves in a manner which shows respect for themselves as well as the schools and organizations they represent.

- Adult chaperones are expected to remain with their students throughout the competitions and other conference activities. All adults not registered as official attendees of the NOBCChE National Meeting must register using the NOBCChE STEM Weekend online registration form: **http://www.nobccheSTEMwkd.com**

- Science Fair Participants must comply with the eligibility rules entailed herein. Participants not meeting these requirements will not be permitted to participate during the official competition. ONE attending Chaperone should be indicated on the Student Registration form for official communications.

- No written report will be need for this fall's national competition

- NOBCChE assumes no responsibility for loss or damage to any project or project part. Valuable items should be simulated or removed when the student is not present at his/her project.

Science Fair Rules and Guidelines

Abstracts and Submissions

1. Students can be enrolled in a public, parochial, or private school in grades 5 through 12. Students who are home-schooled can also participate. Science Fair projects must fair under the following four categories: physical sciences, math & engineering, consumer science, or biological sciences.
2. Suggested Project Titles: **(What is the effect of XXXX (changing variable) on YYYYY (your measured end point)?**
3. Abstracts must be 150 words or less and include the following:
    a. Hypothesis: Based on your reading and information research, organize everything you have discovered, and then make an estimate of what will happen. Knowing certain things are true, you then predict what might happen if you change something. Your experiment, when successful, will allow you to determine if your hypothesis was correct or not.
    b. Methods: Describe the general methods to be used, and why are you using the methods you have chosen? Why have you chosen the described controls? Examples would be spectroscopy, photometric methods, direct measurement, volume displacement, voltage, energy output, etc. WHAT IS YOUR MEASURED END POINT(S)?
4. **Physical Sciences** can include topics like *Study of nature and composition of matter:* physical chemistry, organic chemistry (other than biochemistry), inorganic chemistry, materials, plastics, fuels, pesticides, metallurgy, soil chemistry, etc. *Effect of energy on matter:* optics, acoustics, superconductivity, fluid and gas dynamics, thermodynamics, semi-conductors, magnetism, quantum mechanics, biophysics, etc.
5. **Biological Sciences** can include topics like *Chemistry of life processes:* molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones, metabolism, etc. *Study of plant life:* agriculture, agronomy, horticulture, forestry, plant physiology, plant pathology, plant genetics, hydroponics, algae, etc. *Environmental problems:* air pollution and air quality, bioremediation, soil contamination and soil quality, ecosystems management, water pollution and water quality, environmental engineering, forestry, land use management, recycling, waste management. *Biology of microorganisms:* bacteriology, virology, protozoology, fungi, bacterial genetics, yeast, antibiotics, antimicrobials, etc.

6. **Math and Engineering** can include topics such as *Math Principles:* calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability. *Engineering Disciplines:* civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental engineering, etc. *Computer Science:* artificial intelligence, algorithms, databases, networking and communications, computer graphics, programming languages, and operating systems.
7. **Consumer Sciences** can include topics like *Testing and the comparison of consumer products for their intended use:* Projects this category will draw from fields such as economics, sociology and psychology.
8. **For specific science project suggestions, check these resources:**
    a. http://www.sciencebuddies.org/science-fair-projects/recommender_register.php
    b. http://www.all-science-fair-projects.com/category0.html
    c. http://www.education.com/science-fair/consumer-science/

Project Display Rules

Exhibit size

1. Displays cannot exceed 15 inches (38 cm) deep, front to back; 48 inches (122 cm) wide, side to side; and 5 ft (150 cm) high above the table top.
2. Any materials which are to be displayed must fit on the table in front of the display board.
3. Display boards of 3-4ft height (vs 5 ft) are recommended by the judges for adequate readability.
4. Stands will not be provided, but tables and chairs will be available. Please take advantage of tri-fold boards to ensure self-supporting exhibits.

UNACCEPTABLE FOR DISPLAY
(where possible, use photos or drawings instead)

- All liquids, including water
- Human or animal food (eg., popcorn, M&Ms, etc.)
- Living organisms (including plants, fungi, and bacteria)
- Soil or waste samples, toxic waste samples
- Dried plant materials
- Preserved vertebrate or invertebrate animals or their parts
- Human/animal parts or body fluids (blood, urine)
- Laboratory/household chemicals
- Batteries with open-top cells
- Poisons, drugs, controlled substances, hazardous substances or devices (for example: firearms, weapons, ammunition, reloading devices, model rockets)
- Dry ice or other sublimating solids (solids which vaporize to a gas without passing through a liquid phase)
- Sharp items (for example: syringes, needles, pipettes, knives)
- Any flames, open or concealed, or highly flammable materials
- Gases or empty tanks that previously contained combustible liquids or gases, including butane and propane
- Awards, medals, business cards, flags, endorsements or acknowledgements from previous fairs.
- Photographs of people other than student presenter(s)

Display Tips

1. Inexpensive display boards and other display aids are available at most office and art supply stores.
2. Use type families and colored backgrounds to associate groups of information throughout your display. Remember that black or dark type is easiest to read and that judges do notice spelling and grammar.
3. Your title should be big, easy to read, and capture the spirit of your research. You can use two titles if you wish, a scientific one on top and one for the lay audience below it.
4. **Possible sections for your board might include: Introduction, Background, Hypothesis, Experimental Design, Results or Data, Discussion or Conclusion and Discussion, Further Research.**
5. "A picture is worth a thousand words." Photographs and drawings are good display tools: they help your audience understand your research and are eye-catching aids for your display.
6. Use the largest possible visuals and type. Important text should be legible from at least three feet away. Use font sizes of at least 24 points on your display board.
7. Use brief statements. Aim to have three to five bulleted statements, each 10 to 20 words per section.
8. Tables of numerical data have a place—but maybe it's in the notebook rather than on the display board. Use graphs or charts instead of tables wherever possible.
9. Label the units of measurement used on each chart axis (e.g., "Centimeters of Rain," "Years," "Number of Ladybugs"). Use metric (SI) measurements and scientific names if possible.
10. Caption your graphs and charts and indicate trends, conclusions drawn, etc.

Commonly Asked Questions by Judges

1. Can you explain this graph to me?
2. Can you explain your procedure to me?
3. What was your control?
4. Why are your findings important?
5. Who helped you?

Determining Winners

When you return to your judging panel and deliberate on the projects, you can use a few simple criteria for selecting the winners:

- The quality of the student's work is what matters, not the amount of work;
- A less sophisticated project that the student understands gets higher marks than a more sophisticated project that is not understood
- It's okay if the student ended up disproving the objective or hypothesis of the experiment.

High marks go to:

- Correctly interpreting data
- A clever experimental apparatus
- Repetitions to verify experimental results
- Ability to clearly portray and explain the project and its results
- Results are reported in units: growth, size, mass, speed, time, volume, frequency, replication rate, chemical product analysis, etc.

Low marks go to:

- Ignoring readily available background information (e.g. not doing basic library research)
- Improperly using jargon, not understanding terminology, and/or not knowing how equipment or instrumentation works
- Presenting results that were not derived from experimentation (e.g. literature search)
- Projects that lack a measurable endpoint

2017 NOBCChE Science Fair Judge Score Sheet

Abstract **(/5)**	• Concisely sums up the project explaining the test, the outcome, and the conclusion
Poster Presentation **(/20)**	• Neatness • Clarity of Text • Use of images, graphics, tables, and graphs
Background **(/10)**	• Understands underlying concepts • Why this project can benefit society
Hypothesis **(/10)**	• References a cause and effect relationship and a measureable change • Based on background research
Variables **(/10)**	• Clearly defined (independent, controlled, dependent) – may be worded as "What I changed," "What I kept the same," and "What I measured"
Materials **(/10)**	• Appropriate and a detailed list is given
Procedure **(/10)**	• Steps are sequential and describes the investigation clearly
Data and Analysis **(/10)**	• **Quantitative data**: numbers, standard metric units, scale made up by the student, or **Qualitative Data**: words, descriptions of physical or behavioral changes • Describes the trends or patterns found in the data; may have comments on reasons for trends or patterns
Conclusion **(/10)**	• Based on analysis of the data; acceptance or rejection of hypothesis or success of invention/solution; suggestions for further efforts
Acknowledgements: **(/5)**	• If not cited already in research, those who helped with the project

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