North Davis Preparatory Academy

2018

NDPA Science Fair Information Packet

Dear Parents, Guardians and Students,

We are excited to announce this year's science fair, to be held **Wednesday, January 31, 2018. *New date from last year. 6th Grade Mini-Fair will be held on January 26, 2018.**

All 6th & 9th graders are required to participate. All other students, unless specified otherwise by their teachers, are encouraged to participate. Science fairs emphasize the learning of science through experimentation, observation, identifying problems, proposing solutions and interpreting data.

Enclosed is a science fair packet to aid you in completing your project. The packet contains:

- Important Dates
- Project Guidelines and Rules
- Judging Criteria
- Registration Form

We look forward to your participation. Please contact me with any concerns or questions.

Sincerely,
Rhonda Adams, Science Fair Chair
radams@northdavisprep.org

PACKET CONTENTS:

NDPA Science Fair at a Quick Glance

Who May Participate

All students are encouraged to participate. K-3 projects will be judged separately (no interview required). 4-6 grade projects will be judged by three judges.

- 9th grade is mandatory.
- For all other grades (K, 1, 2, 3, 4, 5, 7, 8), participation is optional, but encouraged. Students may enter individual projects or team projects (up to 2 students per team).
- The 6th grade Mini-Fair will select the top 25 projects to participate.
- The top winners in the 6th-9th grade in the NDPA Science Fair may be given the opportunity to participate at the Ritchey Science and Engineering Fair at Weber State University, March 22nd and 23rd 2018.

Important Dates

- **Registration Forms Due** — Friday, December 15, 2017 (Turn in to your science teacher), **NO LATE REGISTRATION WILL BE ACCEPTED (with the exception of the 6th grade Mini-Fair winners).**
- **6th Grade Mini-Fair** — Friday, January 26, 2018; 6th grade classes. *top 25 projects will move on to the NDPA science fair.
- **NDPA Science Fair** — Wednesday, January 31, 2018
  *__Setup will take place the morning of the fair, Wednesday, January 31, 2018 from 7:30 – 8:30 a.m. (Junior High must be finished by 8:10 to be on time to classes)__
- **Ritchey Science Fair @WSU** — March 22, 2018 Junior SF (6th-8th)
  March 23, 2018 Senior SF (9th-12th)
  *9th Grade students going to Spain will be given the option to compete in Utah State University Regional Science Fair. More details to come.

Display Size

Maximum height of the exhibit is 95 cm (38 in), not including the table. Displays may not be more than 76 cm (30 in) deep, front to back; and 122 cm (48 in) wide, side to side. There are no exceptions.
Display boards can be purchased from various locations around town if needed.

Metrics

Remember to use metric units with all measurements.

Electricity

Note whether your display requires electricity. Provide your own extension cord (label with your name).

Judging

Grades K-3 will be judged by one judge and are not required to be present for an interview.
Grades 4-9th projects will be judged by three judges. Please refer to judging criteria for further information.

Display Set Up

__Mandatory__ Wednesday, January 31, 2018 **From 7:30 – 8:30 A.M. __(Junior High must be finished by 8:10 to be on time to classes)__**

Judging	Wednesday, January 31, 2018; 9:00 am – 12:00 pm, 2017
Classes Visit Displays	Wednesday, January 31, 2018; 1:00 – 3:00 pm
Public Open House	Wednesday, January 31, 2018; 6:30 – 7:00 pm
Awards Ceremony	Wednesday, January 31, 2018; 7:00 pm
Display Take-down	Immediately after the evening awards ceremony
Web Sites For More Info	http://school.discovery.com/sciencefaircentral http://www.ritcheysciencefair.org/ http://sciencebuddies.org

Parental Involvement

By sharing science experiences, parents demonstrate that learning is important and enjoyable. The key is that parents not do too much. Parents can offer advice, help gather materials, assist in constructing the display, and proof-read grammar. The research and overall project, however, should reflect the student's efforts.

Scientific Method or the Engineering Design Process (8 Steps)

All Science Fair projects should demonstrate the 8 steps of the Scientific Method or the steps in the Engineering Design Process

Scientific Method

1. **Problem or Question:** What are you trying to learn more about?
2. **Research:** Sources cited. Use to help write a hypothesis.
3. **Hypothesis:** An educated guess based on background knowledge learned during research.
4. **Procedure:** Has several parts
   a. Detailed procedure (must have multiple trials)
   b. Material list
   c. The control is listed (the item that everything is compared to)
   d. The independent variable (the item the student changed to have an experiment)
   e. The dependent variable (what may have changed because the independent variable was instituted)
   f. The constants of the experiment (all of the factors kept the same so that only the independent variable was tested)
5. **Data:** Gather information.
6. **Results:** Show what happened.
7. **Conclusion:** Tell what you learned.

Engineering Design Process

1. **Define the Problem:** What is the objective?
2. **Research:** What other designs have been done before?
3. **Specify Requirements:** How is this different from an existing technology?
4. **Brainstorm Solutions:** Are there multiple solutions to your objective?

5. **Choose the Best Solution:** What changes can be made to improve upon it?
6. **Build a Prototype:** A model of your idea
7. **Test and Redesign:** What changes can be made?
8. **Communicate Results:** Have data and written report to show what you learned.

Project Categories

(http://www.ritcheysciencefair.org)

A category must be specified on the registration form in order for it to be valid.

- **Botany:** Study of plant life.
- **Microbiology:** Biology of microorganisms.
- **Zoology:** Study of animals.
- **Chemistry:** Study of the composition of matter and laws governing it.
- **Earth/Space Sciences:** Study of the universe.
- **Engineering/Computer Science:** Technology projects that directly apply scientific principles to practical uses.
- **Energy and Transportation:** Study of the energy and transportation. Aerospace and Aeronautical Engineering, Aerodynamics, Alternative Fuels, Fossil Fuel Energy, Vehicle Development, Renewable Energies, etc.
- **Environmental:** Study of pollution sources and their control.
- **Math/Physics:** Development and application of numerical computations\ theories, principles and laws governing energy also includes computer sciences. Calculus, geometry, abstract algebra, number theories, statistics, complex analysis and probability.
- **Medical:** Study of disease and health of humans and animals.
- **Social/Behavioral:** Study of human & animal behavior and relationships.

Project Restrictions:

NDPA Science Fair projects may not use the following materials.

- Rodents (Research on small rodents can't be carried out in a student's home because housing conditions there do not meet Animal Welfare Act standards)
- Animals and humans can't be subjected to pain, weight loss, invasive procedures, or other risks.
- Illegal drugs
- Weapons

Display Restrictions:

The following materials can be used in a science fair project, but they cannot be brought to the science fair and displayed. Use photos or drawings of the project instead.

- Living Organisms, including plants.
- Taxidermy specimens or parts.
- Preserved vertebrate or invertebrate animals.
- Human or animal food.
- Human/animal parts or body fluids.
- Plant materials (living, dead, or preserved) in their raw, unprocessed, or non-manufactured state.
- Laboratory/household chemicals including water.
- Hazardous substances or devices.
- Dry ice or other sublimating solids.
- Sharp items (for example, syringes, needles, pipettes, knives).
- Flames or highly flammable materials.

- Batteries with open-top cells.
- Awards, medals, business cards, flags, acknowledgements, etc.
- Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissections, necropsies, or other lab procedures.
- Active Internet or e-mail connections as part of displaying or operating the project.

Registration:

- **All participants must register by Friday, December 15, 2017**. (Exception: 6th grade participants will register after the 6th grade Mini-Fair)

Overview of a Science Fair Project….

(http://community.weber.edu/sciencefair/workshop.htm)

Where to Begin….

A Science fair project is the presentation of an experiment or a research effort. It's an investigation that tries to answer a question or solve a problem.

Example: Can paper be used to separate the dyes in food colorings?
Which paper separates the dyes the best?
Which solvent works the best?
Does it work with Kool-Aid dyes?

The First Step: Select a Topic
The best project is one that you're interested in. Focus on hobbies, sports, or things that would be fun. Science deals with plants, animals, medicine, physics, chemicals but also with TV, music, basketball, aerobics and every other part of life. Remember, a science project should answer a question, not just show what you know about something.

The best project is one where you can gather data.

Gather Background Information
Get information on your topic from books, magazines, the Internet, people and companies. Remember to keep notes about where you get information.

Organize and Theorize
Organize everything you have learned about your topic. Decide on a problem and form a hypothesis (prediction) by focusing on a particular idea.

Make a Timetable
Choose a topic that can be done in the amount of time you have. Allow plenty of time to experiment and collect data.

Plan Your Experiment
Once you have your idea, decide how you will perform the experiment and design a specific procedure you will use. Remember to have a variable or something that you can change. This is an important part of the scientific method.

Conduct the Experiment
While doing your work, keep detailed notes of every experiment, measurement, and observation. Don't change more than one variable at a time. Use a control in which none of the variables are changed. This validates your experiment. Include sufficient numbers of

test subjects so that you can get accurate results. Use METRIC units of measurement.

Examine Your Results
Once you have completed the experiment, then examine your findings. Did the experiment give you the expected results? Did you use the exact same steps each time you preformed the experiment? Were there any errors in your observations? Understanding errors is an important part of a successful project. Statistically analyze your data if possible.

Draw Conclusions
Was your hypothesis correct? You should be able to state if your hypothesis was correct or not. A hypothesis does not have to be correct in order for the experiment to be valid. Results are often exhibited in the form of charts and graphs.

Judging Information

Because some of our students may have the opportunity to advance to the Weber State University Junior and Senior Science Fair, we will use the same judging criteria at NDPA as Weber State University which uses two classifications for projects: Scientific Process and Engineering Design Process. See: http://www.sciencebuddies.org/engineering-design-process/engineering-design-compare-scientific-method.shtml for a comparison of the two classifications.

Tips on Being Judged

Science fair judges are often teachers, scientists, or people from science related industries in the area. They are interested in hearing about your project and are not there to frighten or try to stump you. They simply want to hear about what you investigated, how you did the work and how well you understand what you found. Your presentation is just as important as any other part of your project.

A normal judging interview goes something like this:

1. Introduce yourself.
2. Give the title of your project.
3. Explain the purpose of the project.
4. Tell the judge how you became interested in the topic.
5. Explain the procedure that you used in the project.
6. Show and explain your results and conclusions.
7. Tell the judges what you might do to expand the project in the future.
8. Explain any applications that your project might have.
9. Ask the judges if they have any questions and thank them for listening.

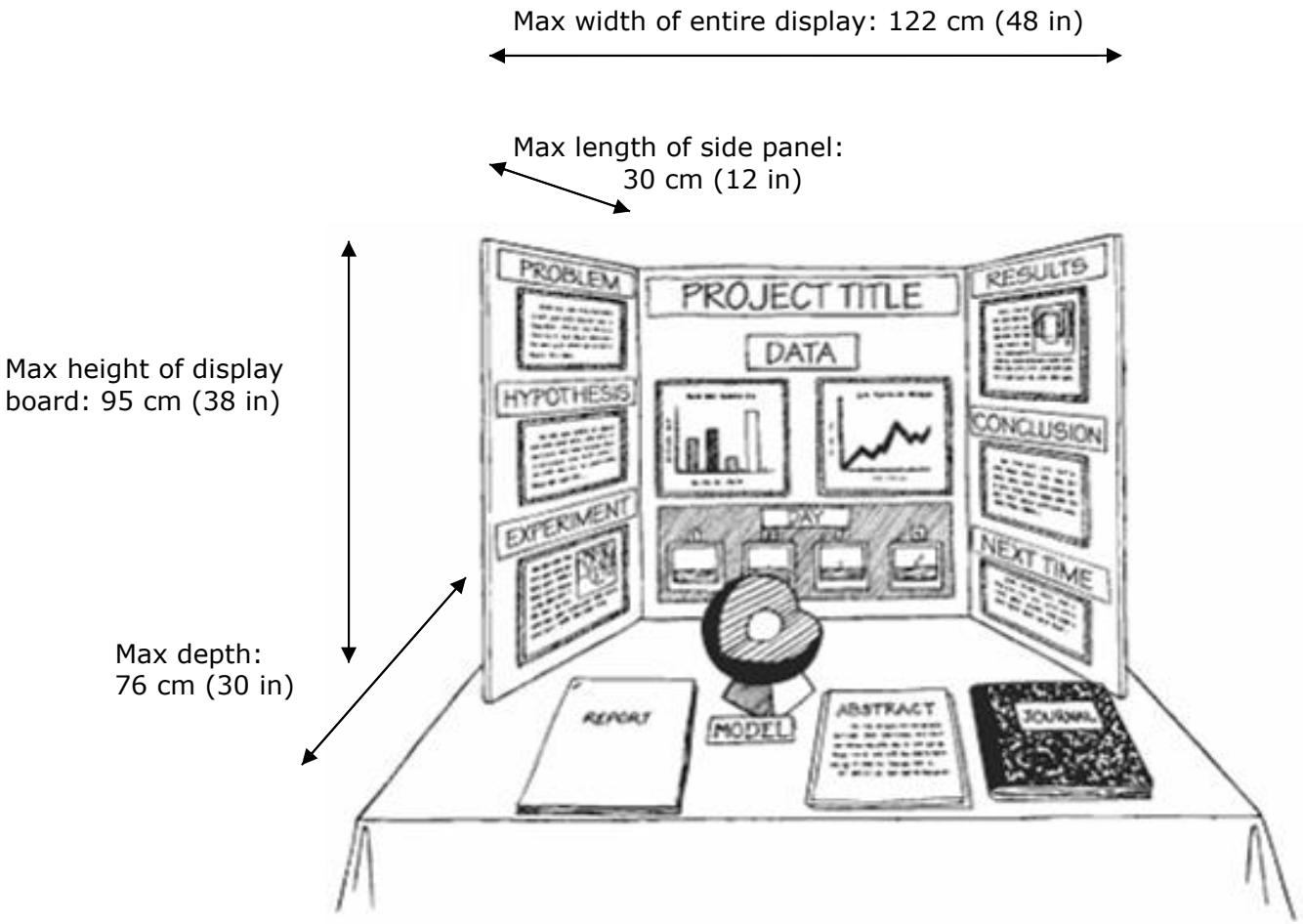
Time Considerations
Most judges can only spend a short period of time at each project, so you should make good use of that time. Impress the judges with how smoothly you can talk about your project. Limit your presentation to those portions of the experiment which are vital to your project.

Appearance
You should dress up to be judged. This is an important event at which you should look clean and professional. Wear your best NDPA uniform. Stand up straight and don't chew gum, eat or drink. Smile. Remember, this is an interview. Be presentable.

Get the Judges Involved in Your Project
Let the judges hold your notebook, research paper, or apparatus. Point out charts, graphs and photos on your display. Speak loudly enough to be heard by all of your judges. Remember to pay attention to what your judges are saying and always be polite. Maintain good eye contact with the judges.

Between Judges
Stay at your project because you never know when a judge will be coming. Practice any part of your presentation that has given you trouble with past judges until it is smooth. Do not leave your project until it is announced you are free to leave. You will have a minimum of two judges. Bring a book to read or homework to do, so that you will have something quiet to do while waiting for the judges.

Display Example
(http://school.discovery.com)



When preparing your display and presentation, use the following checklist:

- ☐ Your display is the right size. Maximum height of the exhibit is 95 cm (38 in). Displays may not be more than 76 cm (30 in) deep, front to back; and 122 cm (48 in) wide, side to side. There are no exceptions.
- ☐ The project display board can stand by itself.

- ☐ Your name and teacher's name are written on the BACK of the project display board, and on any written materials included in your display, so that they can be returned to you if they get misplaced.
- ☐ You've included an extension cord if you need electricity for your project.
- ☐ You've brought extra tape, scissors, etc., to make any repairs if your display falls.
- ☐ You've included an abstract (one-page summary of your project) with bibliography.
- ☐ You've included your research report with bibliography.
- ☐ You've included your logbook of daily work (if applicable).
- ☐ You're ready to give your oral presentation (3 to 5 minutes) and answer any questions the judges ask.
- ☐ You've brought a book or homework to do while waiting for the judges.
- ☐ You're ready to have fun showing off what you've learned!

The NDPA Science Fair committee, the cooperating teachers, sponsors, and North Davis Preparatory Academy administration assume no responsibility for loss of damage to any exhibit or part thereof.
Also, this is an Entry Level Science Fair. This is a learning experience. Volunteers are asked to help judges. We are grateful for the time these judges put into coming to our Science Fair. Your child or children may get a judge that judges harder than another. Please review the "Tips on Being Judged", on page six so your child or children can do the best they can.

NDPA Science Fair Judging Sheet

Scientific Process

Student name: _____Student's Grade Level: _____

Project name:

_____

_____

Judge's Number: _____

Scientific Thought (20 Points) **_____ / 20**

0	1	2			Is the problem clearly stated?
0	1	2			Is the hypothesis clearly stated?
0	1	2			Are the independent and dependent variables clearly stated?
0	1	2			Is the control clearly stated?
0	1	2	3		Was the experiment tested multiple times?
0	1	2	3		Was the experiment sample size sufficient?
0	1	2	3		Are conclusions or summary remarks clearly stated and justified by the data?
0	1	2	3		Does this project have application the real world?

Originality (8 Points) **_____ / 8**

0	1	2	3	4	How original is the problem being investigated?
0	1	2	3	4	How creative is the approach or experimental work?

Display Board (12 Points) **_____ / 12**

0	1	2	3	Does the display board show all of the steps of the scientific experiment?
0	1	2	3	Is the display board neat, organized and have correct spelling?
0	1	2	3	Is the graph or chart or table clear and properly labeled?
0	1	2	3	Does the student include a logbook used to collect data and observations?

Interview (10 Points) **_____ / 10**

0	1	2	3	4	Is the presentation clear and orderly?
0	1	2	3		Does the student answer questions effectively and accurately?
0	1	2	3		Does the student demonstrate clear knowledge of the topic?

Total: _____ / 50

Comments:

_____

_____

_____

INSTRUCTIONS for Scientific Method Judging:
+ Circle zero if the item is missing or completely wrong
+ The higher numbers represent the best scores
+ Please circle the one number that best represents the value for each item
+ Please double check that every section has a number circled

The scientific method we utilized and should be shown is as follows:

1. The problem or question
2. Scientific research in order to develop a hypothesis (sources should be cited)
3. Hypothesis (an educated guess as to the outcome of the experiment, it should correspond to the research in step 2)
4. Experiment (this step includes several items)
    - **a.** detailed procedure (must have multiple trials)
    - **b.** material list
    - **c.** the control is listed (the item that everything is being compared to)
    - **d.** the independent variable (the item the student changed to have an experiment)
    - **e.** the dependent variable (what may have changed because the independent variable was instituted)
    - **f.** the constants of the experiment (all of the factors kept the same so that only the independent variable was tested)
5. Analyze Results: students should include a graph/chart/table showing the results and explain in words what the results mean
6. Conclusion: Students should refer back to their hypothesis and either accept it or reject it based upon analyzing their results. They should also discuss how they could have made their experiment better if they chose to redesign it. They should also discuss some possible sources of error. Lastly they should tell how their experiment has real world application.

NDPA Science Fair Judging Sheet
Engineering Design Process

Student name: _____Student's Grade Level: _____

Project name: _____
_____

Judge's Number: _____

Scientific Thought (20 Points) **_____ / 20**

0	1	2		Is the objective of the project clearly stated?
0	1	2		Were the potential users and uses of the technology identified?
0	1	2		Was a range of operating variables considered and clearly stated? Were the proper units considered in the tests?
0	1	2		Has the solution been tested for performance under the conditions of use?
0	1	2	3	Is the solution: workable? Acceptable to the potential user? Economically feasible?
0	1	2	3	Is the solution a significant improvement over previous alternatives or applications?
0	1	2	3	Are conclusions or summary remarks clearly stated and justified by the data?
0	1	2	3	Could the solution be utilized successfully in design or construction of an end product?

Originality (8 Points) **_____ / 8**

0	1	2	3	4	How original is the problem being investigated?
0	1	2	3	4	How creative is the approach or experimental work?

Display Board (12 Points) **_____ / 12**

0	1	2	3	Does the display board show all of the steps of the scientific experiment?
0	1	2	3	Is the display board neat, organized and have correct spelling?
0	1	2	3	Is the graph or chart or table clear and properly labeled?
0	1	2	3	Does the student include a logbook used to collect data and observations?

Interview (10 Points) **_____ / 10**

0	1	2	3	4	Is the presentation clear and orderly?
0	1	2	3		Does the student answer questions effectively and accurately?
0	1	2	3		Does the student demonstrate clear knowledge of the topic?

Total: _____ / 50

Comments:

_____
_____
_____
_____

INSTRUCTIONS for Engineering Design Process Judging:

+ Circle zero if the item is missing or completely wrong
+ The higher numbers represent the best scores
+ Please circle the one number that best represents the value for each item
+ Please double check that every section has a number circled

The Engineering Design Process we utilized and should be shown is as follows:

1. The Problem: is there a need? Is it an important problem? Is it focused on a particular group?
2. Background Research: Do they show previous models? (sources should be cited)
3. Specify Requirements: Does the project show specific requirements and data for need of a new design?
4. Brain storm Solutions: Does the project show multiple ways for improvements? Or focus on just one?
5. Choose Best Solution: What solution was selected and why?
6. Build Prototype: Does the project have an operational first version of the solution decided upon? If not, what kept prototype from being developed? Was this communicated effectively and seem logical?
7. Test and Redesign: Was the prototype tested and if so, were changes made? (Multiple redesigns constitutes a better score)
8. Communicate Results: Is the data given numerous ways? Graphs, charts, display boards, photographs, verbal? Report written of results and conclusions? Does the project have plans for building improved project?

NDPA Science Fair Registration Form
(Due Friday, December 15, 2017)

Student Name: _____ Grade: _____

Science/Homeroom Teacher: _____

If Team Project, Second Team Member's Name:_____ Grade: _____

Project Title_____

Project type (Circle One): Scientific Method Engineering Design Process

Project Category (Circle One):

Botany Microbiology Zoology Chemistry Earth/Space Science

Engineering/Computer Science Energy and Transportation Environmental

Math/Physics Medical Social/Behavior

Brief Project Description and Research Plan (Outline procedures you intend to follow. Give enough detail that the Science Fair Committee can assess safety concerns):

_____

_____

_____

Electrical Outlet Needed: Yes No

Student Signature:

_____

If Team, Second Student Signature: (will need to do separate form as well)

_____

Parents, Please Read and Agree To the Following:

1. I am aware of the exhibit size requirements.

2. I am aware of the school's restrictions on exhibits.

Parent(s) Signature(s):_____

Student's Science Teacher Review:_____

Science Fair Committee/Safety Review:_____

The NDPA Science Fair Committee, the cooperating teachers, sponsors and North Davis Preparatory Academy administration assume no responsibility for loss or damage to any exhibit or part thereof.