

DOANE ACADEMY

14th ANNUAL S.T.E.A.M. FAIR

December, 2016

Dear Parents and Students,

Each year our student body comes together on one day in the winter to celebrate all things Science, Mathematics, Engineering, Arts, and Technology (S.T.E.A.M.) related during our annual STEAM Fair. This year's Upper School portion of the fair will be held on **Friday, February 10th from 5:30 to 8:30 PM. Participation in this event is mandatory for all students.**

During the school day, our Upper School students will help with our Lower School STEAM Fair by serving as judges for members of their School Family. Then in the evening, over 70 visiting professionals from various STEAM-related fields will evaluate and grade student projects and presentations during the event. The project will be counted for a grade in each student's science course. Students are free to work with up to two additional members of their science class on their project.

The STEAM Fair Committee has created a series of grade-level projects that connect to each Middle Division Science class's curriculum. 6th grade students will create their own world using concepts learned about plate tectonics, planet interiors, and the solar system. They will also describe a civilization that lives on that world. 7th grade students will tackle plant growth by selecting two separate control variables and observing how they alter the plant's growth rate. 8th grade students will assemble Rube Goldberg Machines capable of applying a Band-Aid to a surface and which incorporate simple machines in their assembly. A summary description of each project can be found in this packet. Mrs. Butchko and Dr. McCormick will share further details about the projects, including grading expectations and specific project guidelines, during their science classes.

Please review the following pages which contain a project proposal form, project guidelines, safety requirements, and an order form for tri-fold display boards. **Project proposals are due to your science teachers by Wednesday, December 14th.**

Parents - Are you or a friend interested in serving as a Judge for this year's STEAM Fair? If so, please sign up to do so at <http://www.tinyurl.com/DoaneSTEAM2017>.

Please contact your grading teacher or Mr. Russell if you have any questions.

Mr. Michael Russell
Chair, Math and Science Departments
S.T.E.A.M. Coordinator

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MIDDLE DIVISION PROJECT SUMMARIES

6TH GRADE - PLANETARY DESIGN AND WORLD BUILDING

As the 6th grade students have learned thus far in Earth Science, each of the planets in our solar system have different geological features as a result of how they were formed, what their atmosphere contains, where they are relative to our Sun, and what happens at their cores. For their projects, the 6th grade students are challenged to create their own planet that exists in our solar system and explain how humans live on its surface. Students will design the surface features of a continent on their planet, describe the weather patterns experienced there, and design two objects that help them explain how humans can live on their planet.

7TH GRADE - THE MANY VARIABLES OF PLANT GROWTH

For their Life Science project, 7th grade students are challenged to design and execute their own experiment by trying to affect - positively and/or negatively - the growth rate of a plant. Students will research and select a rapidly growing plant to determine what the ideal growing conditions are for it. Then, they will choose 2 control variables to alter and compare the growth results of these altered conditions to the plant they've grown in ideal conditions.

There are many different control variables the students can select, ranging from practical to “zany.” Students may alter the pH of the soil, the ambient room temperature, or the wavelength of light. They may also expose the plant to different genres of music, different volumes of ambient noise, or even different growing methods like hydro- and aeroponics. The goal is for the students to have complete control over the design of their experiment, and to pursue answering their self-developed hypothesis using the scientific method.

8TH GRADE - RUBE GOLDBERG MACHINES

Rube Goldberg Machines are named after the famous cartoonist who was known for creating elaborate, useless machines to complete basic tasks. These machines are often comical, most likely unnecessary, and usually follow a narrative story arc. Most people first gain exposure to Rube Goldberg Machines through the board game “Mousetrap” or the “Tom & Jerry” cartoons. In memory of Mr. Goldberg’s legacy, Rube Goldberg Inc. hosts an annual competition to complete a simple tasks. This year’s task is to apply a Band-Aid.

For their STEAM Fair project, 8th grade students are asked to create a Rube Goldberg Machine that adheres to this year’s Rube Goldberg Inc. competition rules. The machine must feature at least 10 steps - a step is defined as a transfer of energy from one form to another - and include at least 3 simple machines. Additionally, the Rube Goldberg Machine must be themed to “tell a story” as it progresses through its steps. Past winning project themes include “Classic Nintendo” and “Raining Cats and Dogs.”

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14th ANNUAL S.T.E.A.M. FAIR

Project Guidelines and Requirements

I. TIMELINE OF PROJECT DUE DATES

- | | |
|--|--------------------------|
| 1. Project Registration Form and Proposal: | Wednesday, December 14th |
| 2. Project Check-ups: | |
| A. Check-in 1 | Monday, January 9th |
| B. Check-in 2 | Monday, January 23rd |
| C. Check-in 3 | Wednesday, February 1st |
| 3. Final Project Due: | Wednesday, February 8th |

II. ACADEMIC INTEGRITY (HONESTY)

All students are expected to adhere to the Academic Honesty expectations as outlined in the Student Handbook. All information included in your display must be in your own words. Printing information from the internet and displaying it on your board is considered plagiarism and will not be tolerated. Sources for all researched material must be properly cited on the board.

III. SAFETY RULES

1. Students may not do experiments involving bacteria cultures unless plans are approved in advance by Mrs. Rupert, Upper School Biology Teacher.
2. Experiments which use vertebrate animals or humans as subjects should cause no harm or undue stress to the subject(s). No live vertebrate animals may be exhibited at the STEAM Fair.
3. Teeth, hair, and nails are the only human body parts that may be displayed.
4. No open flames, controlled substances, or dangerous/combustible chemicals may be displayed. Rockets or engines cannot contain fuel if displayed inside a building.
5. All chemicals displayed must have their contents clearly marked on their container(s). Any project that includes displayed chemicals must first be inspected by Mr. Gibbons, Upper School Chemistry Teacher.
6. Students must wear proper safety gear and follow standard safety practices when working with chemicals, hot liquids, fire, etc.
7. All projects using electricity must conform to standard wiring practices and safety.
8. Doane Academy is not responsible for the loss of or damage to expensive or fragile items. As such, do not display any such items. In particular, students are responsible for all personal electronic devices used as a part of their displays.
9. Any and all exemptions to the aforementioned rules must be approved by the STEAM Fair Committee and a faculty sponsor.

DOANE ACADEMY

14th ANNUAL S.T.E.A.M. FAIR

Project Guidelines and Requirements Continued

IV. DISPLAYS

1. 3-sided display boards are suggested as the best means to display the results of a project. Though you may choose another type of board, all projects must include a board of some kind.
2. With the growing diversity in the type of project it is understood that some students may have unique display needs beyond the use of the board. Such needs must be communicated to the STEAM Fair Committee in advance.
3. You must supply a table and any additional display stands as needed for projects exceeding 2'x4' in dimensions. 8th Grade Rube Goldberg Machines must either be capable of free standing on the floor or the project team will have to supply a table.
4. You display boards and other displayed objects must be freestanding and properly secured. We cannot attach anything to the walls.
5. If your display has the potential to be "messy" we ask that you bring materials to project the floor and to clean up any potential spills.
6. If you require access to an electrical outlet, you must supply your own extension cord. Note that some students will have projects stationed as much as 50 ft away from a power outlet.
7. **Key Display Components:** At the very least, your display should include the following:
 - a. Project Title and Student Name(s)
 - b. Introductory information about the chosen topic
 - c. Project development / research / experimentation process
 - d. Results / What was learned

V. PRESENTATIONS

1. All projects will be evaluated by at least one teacher and at least four visiting judges.
2. Presentations will last at least five minutes and no more than ten. Students should practice their presentations beforehand in preparation for the time constraints.
3. After presentations, students will experience a 2-3 minute question and answer session with the visiting judges.
4. Judging will occur for the first hour of the event. After judging concludes, students should remain with their projects and be ready to present to visiting parents and guests. Additionally, judges will be free roaming to continue judging projects at their leisure.
5. The judges' evaluations will count for 10% of your final grade on the project.

VI. AWARDS

Following the event, the STEAM Fair Committee will meet to review all of the projects and determine a 3rd, 2nd, and 1st Place winner. Those students who worked on these projects will be recognized and entered in a competitive STEAM Fair later this year.

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14th ANNUAL S.T.E.A.M. FAIR

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14th ANNUAL S.T.E.A.M. FAIR

PROJECT PROPOSAL FORM and ESSAY

(Due from each group Wednesday, December 14th along with proposal essay)

Name : _____ Grade: _____

Project Title: _____

List of other group members (maximum of 3 with teacher approval):

1. _____

2. _____

Will your project require electricity? _____ Yes _____ No

You are responsible for bringing your own power strip

Does your project have space or equipment requirements? If so, explain.

*(**You are responsible for supplying any additional display materials for projects larger than 2'x4' including additional tables, display boards, etc.**)*

Please attach the following to this project registration form to complete your registration:

1. Your typed 1-2 page proposal explaining the preliminary research you've completed, initial design ideas, and a summary of your plan for completing the project. *(See specific project packet for grading details)*
2. An order form for a display board if purchasing one through Doane Academy.
3. A signature from a sponsoring faculty member for those projects supported by non-science teachers.

I have read and understand the S.T.E.A.M. Fair project requirements, and believe my project proposal is accurate, complete, and my own work.

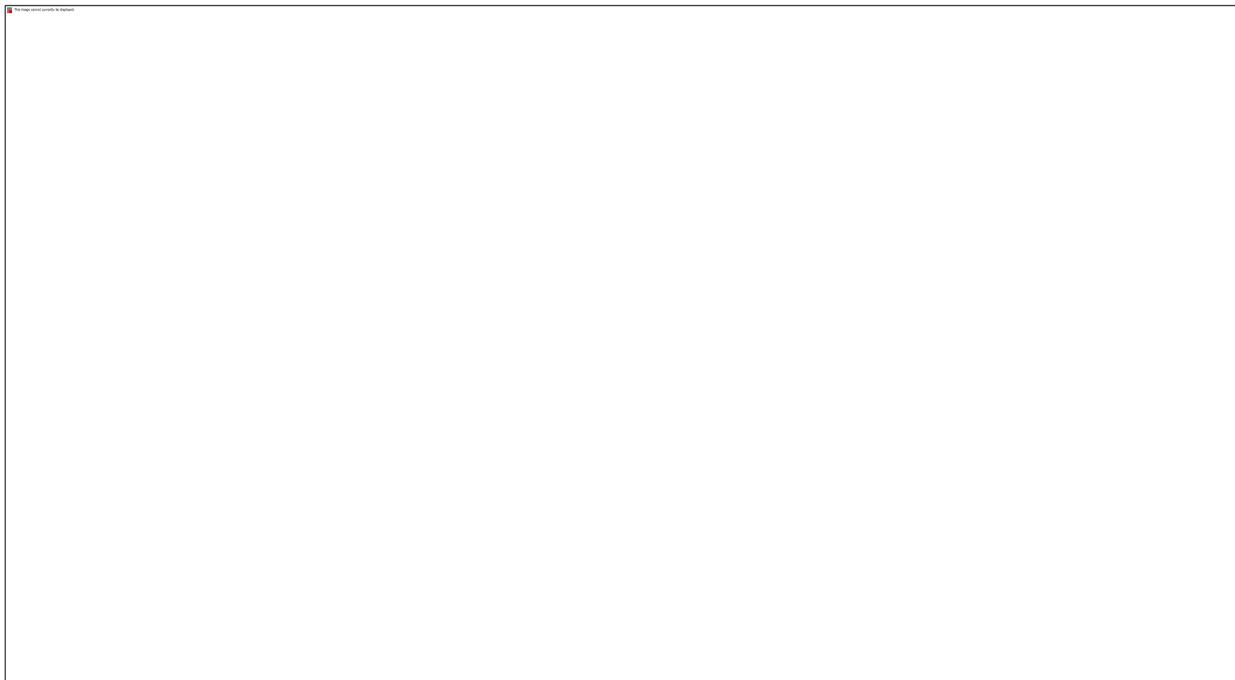
Student Signature: _____

Parent Signature: _____

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SUGGESTED DISPLAY BOARD LAYOUT



----- CUT HERE -----

PROJECT DISPLAY BOARD ORDER FORM

A limited quantity of tri-fold presentation boards are available for purchase.

Name: _____

Grade: _____

of boards (\$10.00 each): _____

Total \$ enclosed: _____

Please return this form with payment in an envelope along with your project registration form and proposal by Wednesday, December 9th.

(Note: You do not have to order a display board through the school. You may purchase one on your own, or choose to display your project in a different manner.)