

GREATER SAN DIEGO SCIENCE & ENGINEERING FAIR (GSDSEF)  
**PROJECT PROPOSAL/SIGNATURE\* FORM (GSDSEF-1, 2015)**

**This form must be completed and signed prior to starting project work. It must be placed in the student's notebook with an ABSTRACT OF THE PROJECT for the GSDSEF Screening Fair. (Use the "Tab" key to move from line to line)**

1. Project Title Bridge Strength: Truss vs Arch vs Beam

Is this a continuation of a previous project?  Yes  No

2. STUDENT'S NAME (Last, First, Middle) Nagelvoort, Chris, Jay

2a. Partner's Name (for Senior Division 2 person projects only) \_\_\_\_\_

**EACH SENIOR DIVISION PARTNER MUST SUBMIT A SEPARATE PROJECT PROPOSAL FORM.**

3. Address, City, Zip 9362 Shackelford Court, San Diego, 92126

4. Phone 858 638 9588 email chrisnagelvoort@yahoo.com

5. School Marshall Middle School Grade 8

6. Teacher Elaine Gillum

7. This project involves (check all that apply):

- Live Vertebrate Animals (GSDSEF-2, 2015)
- Humans as subjects, helpers, or interviewees (GSDSEF-3, 2015)
- Hazardous Substances (anything that could cause injury) (GSDSEF-4, 2015)
  - Chemicals
  - Infectious Agents
  - Bacteria, Fungi and/or Molds
  - Mutagenic Agents
  - Carcinogenic Agents
  - Teratogenic Agents
- Human or Other Vertebrate Tissue (GSDSEF-5, 2015)

8. WHERE REQUIRED (see #7 above), the following supplemental forms must be completed and included with the project proposal form (CHECK ALL THAT APPLY):

- Certification of Humane Treatment of Live Vertebrate Animals (GSDSEF-2, 2015)
- Certification of Compliance of Research Involving Humans (GSDSEF-3, 2015)
- Certification of Hazards Control (GSDSEF-4, 2015)
- Certification of Vertebrate Tissue Source & Safety (GSDSEF-5, 2015)

9. Location where experimental procedures will take place: \_\_\_\_\_

9362 Shackelford Court, San Diego, 92126

10. People, companies, etc. providing equipment, materials, workspace: \_\_\_\_\_

Parents

**11. Describe, in 200 – 250 words, the planned project/experiment and the procedures to be used:**

This experiment utilizes three bridge designs for testing: truss, arch, and beam. Testing in this project would lead to the conclusion of which bridge design is the strongest. Models of bridge designs would be constructed out of popsicles. The conclusion would be met by comparing the bridge models' deflections on certain loads and the bridge model that deflected the least would be strongest. There would be three bridge models of the three designs that are each 0.75 meters long. The loads that will be used are 1 – 7 pound loads, with one pound increments. Before testing, the bridge models need to be constructed with popsicle sticks and wood glue. For the truss and arch bridges, their geometric shapes will be graphed for better quality construction. The beam bridge, is the simplest of the bridge designs and will be the control group. Testing will initiate on a testing apparatus, holding the bridge models at each end. The materials needed for testing will be sand for the loads, buckets, string, a scale, and a caliber to measure the deflection. Testing procedures will go as follows, buckets will be filled with sand to the designated load amount, the bridge model will be placed on the testing apparatus, and string will be used to hang the load bucket on the bridge model. From there, the deflection from no weight to loaded bridge can be found. This will be done with all bridges and the final conclusion can then be achieved.

Just before the screening fair, attach a 200-250 word ABSTRACT of your project to this form.

**\*Continue to next page for required Signatures**

GREATER SAN DIEGO SCIENCE & ENGINEERING FAIR  
(GSDSEF) PROJECT PROPOSAL/SIGNATURE FORM (GSDSEF-1, 2015)

REQUIRED SIGNATURES:

Student:

I have read the *Rules and Regulations* of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR and certify that my project complies with them. I understand that failure to meet the terms of these rules and regulations will result in the disqualification of my project.

SENIOR DIVISION: GSDSEF forms meet the requirements of California law; therefore, all Senior Division students agree that, should they be selected to compete at the 2015 Intel International Science and Engineering Fair (Intel ISEF), when they sign all required Intel ISEF forms they will predate them to agree with the date on this form.

*Chris / 6-17-14*  
\_\_\_\_\_  
Student Signature/Date

Parent/Guardian:

I am aware of all potential safety hazards connected with this project, approve the precautions being taken to ensure my student's safety and will, when appropriate, provide guidance and/or supervision. I understand that failure to comply with *Rules and Regulations* of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR will result in the disqualification of the project.

*[Signature] / 6-17-14*  
\_\_\_\_\_  
Parent Signature/Date

Teacher:

I approved this project prior to the student beginning work on it and verified that it complies with the *Rules And Regulations* of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR. Any concerns about the project's design, appropriateness, safety, or legality were submitted to the GSDSEF Scientific Review Committee (SRC) for approval prior to allowing the student to proceed. I understand that failure to comply with the Fair's *Rules And Regulations* will result in the disqualification of the project. I will provide all needed supervision (other than that specified on other included forms) and will ensure that this proposal and all required supplemental forms are included in the student's notebook at the screening fair. I will have the student, if invited to apply for entrance to the GSDSEF, submit all SRC requested certification forms with their 2015 Application for Entrance.

*[Signature] / 9-1-14*  
\_\_\_\_\_  
Teacher Signature/Date

Additional Advisor (if required)

When certification forms (GSDSEF 2, 3, 4 or 5, 2015) are signed by someone in addition to the science teacher, a signature here ensures that the procedures described on these forms will be followed.

\_\_\_\_\_  
Additional Advisor Signature/Date