PROJECT PROPOSAL/SIGNATURE* FORM (GSDSEF form 1, 2018)

This form should be completed and signed prior to starting project work. It must be given to your Teacher who will file it for quick reference if needed.

(Use the "Tab" key to move from line to line)

1. Project Title Antibiotics Vs. Nanoparticles: A Year 2 Study

Is this a continuation of a previous project? ☒ **Yes** ☐ **No**

2. STUDENT'S NAME (Last, First, Middle) Narayana Murthy, Adhithi

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 10808 Scripps Ranch Blvd #104, San Diego, CA 92131

4. Phone 858-329-9411 **email** adhithi.murthy@gmail.com

5. School Marshall Middle School **Grade** 8th Grade

6.Teacher Elaine Gillum

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

- ☐ **Live Vertebrate Animals** (GSDSEF-form 2, 2018)
- ☐ **Humans as subjects, helpers, or interviewees** (GSDSEF-form 3, 2018)
- ☒ **Hazardous Substances (anything that could cause injury)** (GSDSEF form 4, 2018)
  - ☐ **Chemicals**
  - ☐ **Infectious Agents**
  - ☒ **Bacteria, Fungi and/or Molds**
  - ☐ **Mutagenic Agents**
  - ☐ **Carcinogenic Agents**
  - ☐ **Teratogenic Agents**
- ☐ **Human or Other Vertebrate Tissue** (GSDSEF 5, 2018)

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 form 2, 2018)
- ☒ *Certification of Compliance of Research Involving Humans* (GSDSEF form 3, 2018)
- ☐ *Certification of Hazards Control* (GSDSEF form 4, 2018)
- ☐ *Certification of Vertebrate Tissue Source & Safety* (GSDSEF form 5, 2018)

9. Location where experimental procedures will take place: CPKelco Labs

10. People, companies, etc. providing equipment, materials, workspace: CPKelco

11. Proposed project Category: 13. Microbiology

(see "Category Description" on page 10 of the Sample notebook or on the GSDSEF website)

Describe your planned project/experiment and the procedures to be used:

Before starting the experiment, all safety equipment, such as goggles, lab coats, and gloves, should be worn.

Part 1: Making the Neem Extract

1. Pour the Neem leaves and ethanol into the mixer, and mix until the mixture is smooth.
2. Use a filter in order to filter out bacteria from the extract.
3. Put the extract into the vacuum drier. When the extract has evaporated 50%, take the extract, and store it in a jar at room temperature until use.

Part 2: Preparing the Flasks

1. Get 20 flasks, and label them with 1) the combination being used 2) the date & 3) the amount of the combination added. Use different colors for each combination.
2. In a large jar, mix together 1 liter of distilled water, 25 ml of Lauria Broth Powder, and 1 ml of Agar. Use a mixing stick to mix everything together.
3. Obtain the bacteria, and dilute the bacteria 10 times, in order to make it easier to calculate the number of bacteria.
4. Add 25 ml of the Lauria Broth mixture into each flask. Then, add 1 ml of each bacteria into each flask.

Part 3: Create the combinations.

a) Carbon and Neem: Add 200 milligrams of carbon nanoparticles to 1 ml of water, and dilute it. Add to 1.6 mL of it to 8 ml of Neem Extract.
b) Silver and Neem: Add 1.6 mL of silver nanoparticles to 8 mL of Neem extract.
c) Triple Combinations: Add together 1.6 ml of silver nanoparticles, 1.6 ml of the carbon nanoparticles, and 8 ml of the Neem extract.
d) Antibiotics: Dissolve 1 antibiotic into 8 ml of water.

Part 4: The Experiment

1. In five flasks, add the following amounts of the each of the combination. Make duplicates of each.
   a) 100 mcl
   b) 500 mcl
   c) 1 ml
   d) 2 ml
   e) 3 ml

There will also be 4 controls: just silver nanoparticles, just carbon nanoparticles, silver and carbon, and just bacteria.

2. Seal and move the flasks into a shaker. Set the shaker to 245 rpm (round per minute), and at 37 degrees C. After 24 hours, take a 1 ml sample of each flask, using a cuvette. One by one, put each cuvette into the spectrophotometer, and record the results for each sample.

When your project is completed you must prepare a 200-250 word ABSTRACT of your project and include it on a SINGLE slide for the Google Slides or PowerPoint Presentation you submit for screening.

If your project is selected to participate in the GSDSEF in Balboa Park, you will place a copy of your ABSTRACT in the front of your notebook for judges to review.

*Continue to next page for required SIGNATURES for this form

GREATER SAN DIEGO SCIENCE & ENGINEERING FAIR (GSDSEF)

PROJECT PROPOSAL/SIGNATURE FORM (GSDSEF form 1, 2018)

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 2016 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.

Adhithi Narayana Murthy 9/14/17

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 the Rules and Regulations of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR will result in the disqualification of the project.

9/14/17

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) at PhilSciFr@gmail.com 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 form and all required supplemental forms are turned into me for safe keeping, before their Screening PowerPoint is submitted. If the SRC needs to see a form they will request it from you.

Mrs. Elaine SP Gill 10/1/17

Teacher Signature/Date

Additional Advisor (if required)

When certification forms (GSDSEF 2, 3, 4 or 5, 2018) are signed by someone in addition to the science teacher, a signature here ensures that the procedures described on these forms will be followed. 9/14/17

Additional Advisor Signature/Date

GREATER SAN DIEGO SCIENCE & ENGINEERING FAIR (GSDSEF)

CERTIFICATION OF HAZARDS CONTROL FORM

(GSDSEF form 4, 2018)

Any form required for a student's project must be completed and signed **BEFORE** the student begins experimentation. If there are any questions or concerns about a student's project, contact Phil Gay, Scientific Review Committee Chairperson (619) 697-2024 or email Phil at philscifr@gmail.com

Form 4, when required, must be completed prior to starting a project. When the project work is completed and if the student(s) is asked to submit a Google Slide or PowerPoint Presentation for screening, this completed form 4 must be given to your teacher who will file it for quick reference if needed.

The student, and all who sign this form, MUST READ AND COMPLY with the Hazardous Material and Safety requirements for dealing with such materials as: bacteria; molds or fungi; protozoa; chemicals; toxic, corrosive, mutagenic, carcinogenic, teratogenic or infectious agents; venomous animals as explained in *GSDSEF Rules & Regulations page 12--14.*
(To fill out this form, you may use the "tab" key to move from line to line)

Student's Name (last, first, middle) Narayana Murthy, Adhithi Date 9/15/17

Partner's Name (Senior Division only) _____

School Marshall Middle School Grade 8

Science Teacher Advisor - Mrs Elaine Gillum

Project Title Antibiotics Vs. Nanoparticles: A Year 2 Study

Hazardous procedures/materials/substances involved E. coli bacteria

Answer 1 – 10, below, in detail & identify potential hazards clearly (use n/a if none—use additional sheets if needed):

1. **Source of materials to be used** Bacteria & Plant Extracts & Nanoparticles
2. **Disposal method(s) to be used for hazardous materials** Autoclave
3. **Procedures to be performed by the student** Inoculation, adding extracts & nanoparticles
4. **Procedures to be performed by supervising scientist/adult supervisor** Stand by and supervise
5. **Safety precautions to be taken during procedures (be specific for each hazard involved)** Wearing gloves, lab coat, & goggles
6. **Name of adult hazards supervisor, Title, Phone, Company or Organization** CPKelco

Where bacteria, protozoa, fungi, molds, etc. are used, full details are required in 7-10:

7. **Source of microorganism(s)** Fisher Scientific
8. **Genus, species, strain** Escherichia coli
9. **Culture medium** Lauria Broth Liquid Medium
10. **Method & timing of sealing Petri dishes** n/a

Failure to follow ALL ***Rules & Regulations*** will result in disqualification.

I CERTIFY THAT:

- The hazards control rules and regulations of the GSDSEF and the Intel ISEF will be followed.
- The procedures followed will ensure that neither the process nor the materials used constitute any known danger.
- All microorganisms, pathogenic or non-pathogenic, will be handled and disposed of as if pathogenic.
- I have previously signed the completed Form GSDSEF-1, 2018 (which outlined the procedures to be followed for this study).

Student's signature Adhithi Narayana Murthy Date 9-15-17

Parent/Guardian signature [signature] Date 9-15-17

Teacher signature Mrs. Elaine SP Gill Date 10-1-17

Adult Hazards Supervisor signature [signature] Date 9-15-17