**Seton Science Fair Abstract Guidelines For ENGINEERING DESIGN PROJECTS**

(to be written **after** completing the Research Paper)

**Promptness:**

# Due Date: 1st Draft - Fri November 10, 2017 (one copy)

 Final Draft- Wed, November 29, 2017 (ten copies)

**Format:**

**(Upper left hand corner) Upper Right Hand Corner**

**1.Heading Outline:** (See example) ENGINEERING DESIGN PROJECT

# *Student's Name*

*Project Title*

*Project Category*

*Project Number*

## 2.Word Count:

## 250 Word Abstract

**3.Typed, single spaced, on one side of sheet of paper**

## 4.Grammar:

## 3rd Person, Passive Voice, Past Tense (ex. “A water bath was prepared.” not "I made a water bath.")

## 5.Copies:

## 1 copy of 1st Draft (10 Copies to Science Teacher for Final Draft -These copies are used by the judges who will evaluate your science project.)

**Body (Text) of Abstract**

a*)* **definition of Need** with **design criteria** *(2-3 sentences)*

b) **preliminary design**

c) **prototype construction and testing** *(2-3 sentences)*

d**) data** *(1-2 sentences)*

e**) modifications, conclusions** and **applications** *(2-3 sentences)*

Only minimal reference to previous work may be included. The abstract **must NOT include the following**:

*a*) acknowledgments (including naming the research institution and/ or mentor with which you were working), or self-promotions and external endorsements

b) work or procedures done by the mentor

**Note:** For the science fair, one copy of the abstract should accompany the research paper at your project site.

SAMPLE ABSTRACT

**Mary Jones ENGINEERING DESIGN PROJECT**

**Can a Seed Warmer Speed Germination?**

**Plant Sciences**

**PS25** *(Denotes the category* ***Plant Sciences****, and the project number* ***25****)*

 When planting seeds, the often long germination time can delay appearance of new sprouts. If warming seeds while soaking them in water speeds germination, a standard warming machine may be a useful piece of equipment for gardeners in the spring. It must have the ability to keep seeds moist and at a temperature between 75-85⁰ F, and allow exposure to oxygen. An initial prototype was built with a heating pad underneath a potting soil tray. Moisture was kept away from the heating pad by the plastic tray. It was determined that a sealed chamber did not allow enough air circulation to keep mold from growing. Modifications were made to allow open access to air flow.

 50 each radish, bean, and pea seeds were presoaked and held in the germination chamber at 80⁰ F. 50 more seeds of each type were presoaked and kept outdoors at temperatures ranging from 35-50⁰ F. 80% of the seeds in the warming chamber germinated within 3 days, and 10% of seeds in colder temperatures germinated in 3 days, and a maximum of 30% seeds germinated in 10 days in the “cold” group

 The data suggested that an effective warming chamber for presoaked seeds can be constructed. This method may help gardeners speed up the seed germination process. In addition, if only sprouting seeds are planted in a garden, this method may improve the yield of a garden.