



Communicate It!, or Sci Fair Made Simple

MTSEF Training

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Part 1: The Big Picture



Communication!

Science Fair is the **BRIDGE** between...

Your research...

MTSEF

...the public

Communicating Research

○ *Written*

- Log Book
- Research Paper

○ *Visual & Written*

- Science Fair Board

○ *Auditory*

- The Presenter's words





Written Communication: **Log Book**

- Log book is a record of...
 - What...
 - When...
 - How you did EVERYTHING in your research.
- Keys: Attention to detail and thoroughness
- Mainly for your personal benefit, but bring it to the science fair to show how much work you put into your research!

Written Communication: Paper

- The research paper is a **full** report on the purpose, background, procedure, findings, and significance of your research.
- Your paper should be able to stand by itself, with no extra information or interpretation needed.
- **Keys:** Clarity and depth
- **Websites:** The JSHS website is VERY GOOD.
Guide: <http://www.jshs.org/forms/guidelines.pdf>
Ex.: <http://web.utk.edu/~scisym/researchpaper.pdf>



Written and Visual Communication: Project Board

- What the board is not...
 - Art contest
 - Back cover of a paperback novel
 - Your research paper mounted on cardboard!
- The **BOARD** is a **BROAD *summary*** of your research that:
 - Gets people interested in your work
 - Gives them all the information they need to understand what you did on a broad level.
- Keys: Organization, ability to communicate the **BIG IDEA.**

● ● ● | Board & Paper - Similarities

- In written communication, writing style is critical. For scientific writing...
 - NO GRAMMATICAL MISTAKES!!!!
 - **Tense:** Third person passive ALWAYS
 - Ex: Don't write "I poured 20 mL..."
Write "20 mL was poured..."
 - Technical writing is not like English class: more adjectives and adverbs are not necessarily a good thing. Keep it clear and simple.
 - Write everything in paragraph form...keep listing to a bare minimum.



Auditory Communication: YOU!

- Judges sit and read all day. They're lonely...talk to them! Judges WANT to talk to you, so take advantage of the opportunity.

- **Content:**

- Summarize
 - The dreaded five words: Tell me about your project
- Be flexible
- Tell your story
If there is a personal reason, interest, or story that led you to your research, tell it!

- **Attitude:**

- Be prepared!
- Be polished!
- **BE CONFIDENT!**
You know what you are talking about! **Admit it** when you don't know something, but be confident in what you do know. That confidence will show in your presentation.



Communication Overview

- o Use the science fair board as the bridge to help others understand what you did and why you did it!

You & your paper!

BOARD

Judges & public



Part 2: The Elements

The Elements

- Title
- Abstract
- Introduction
- Purpose
- Hypothesis
- Procedure
- Results
- Conclusion
- References
- Acknowledgments

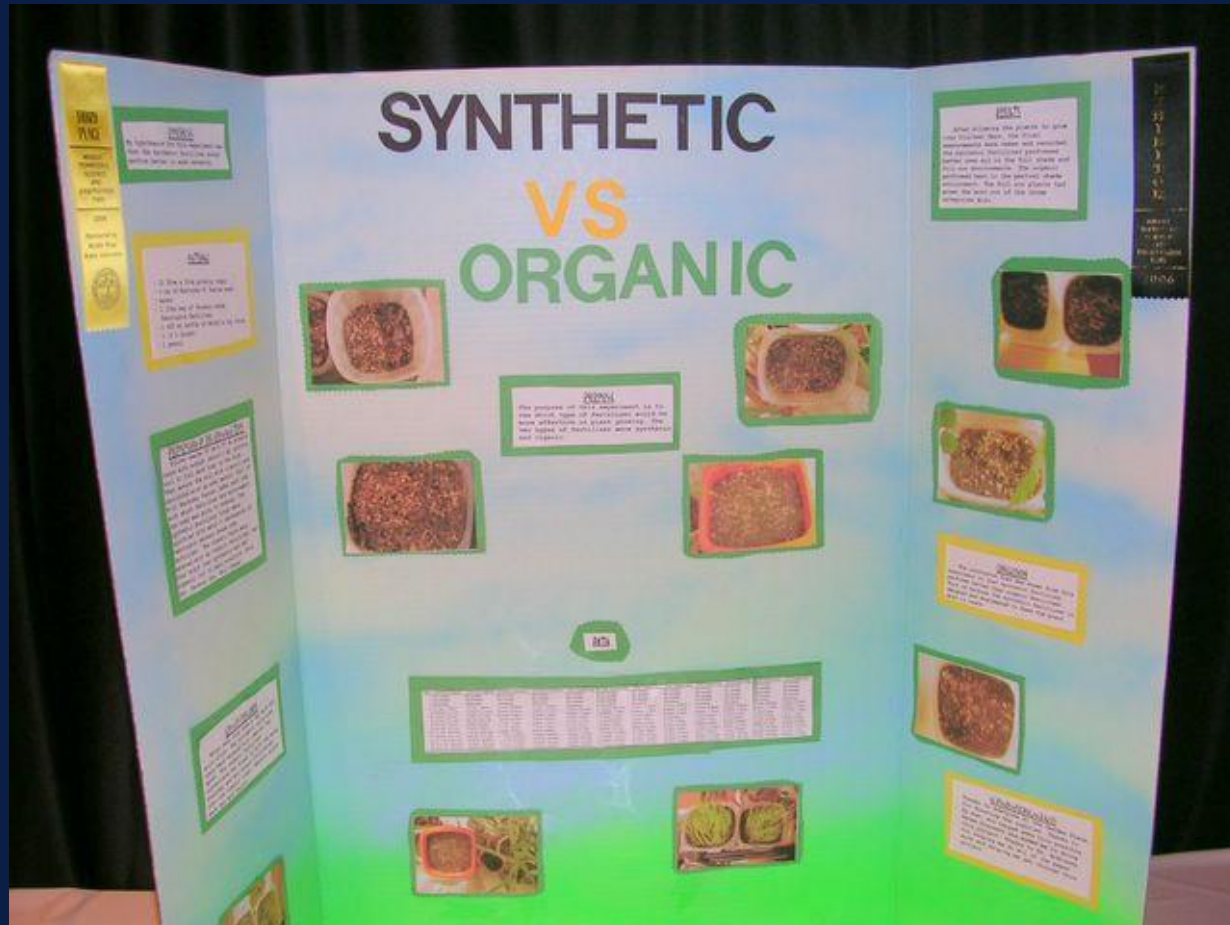




Title

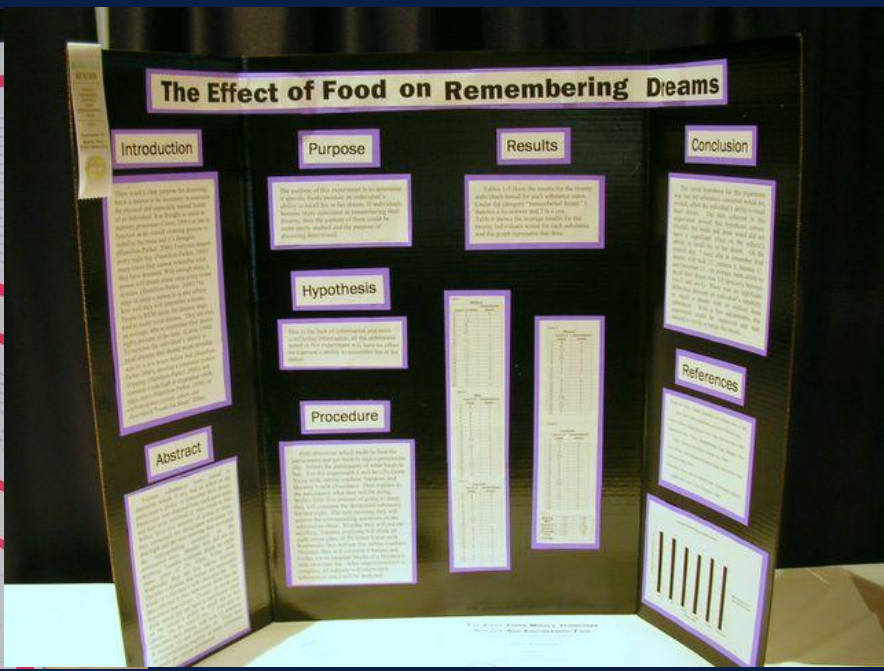
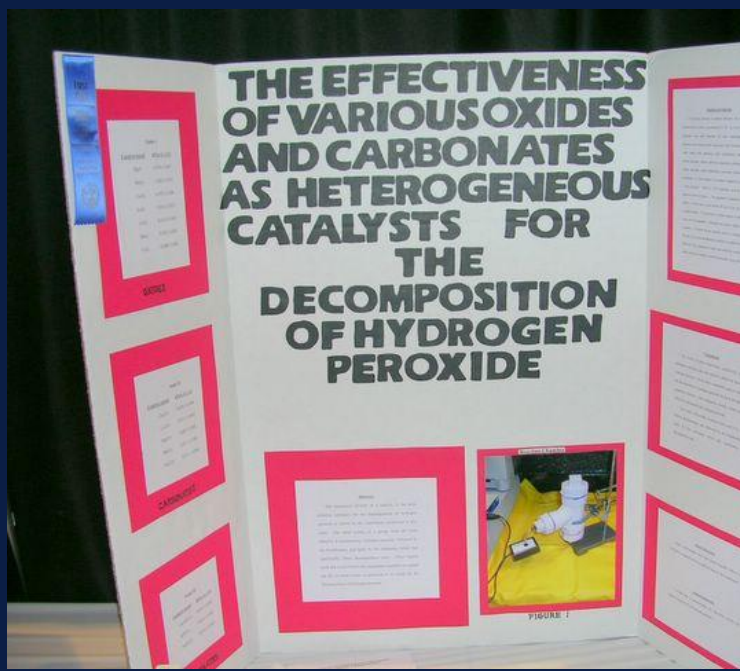
- You don't have to make it catchy! Simple titles are better!
 - Tomato Plant Maturation in UV Light, NOT Fried Green Tomatoes!
- Needs to be large, but not so large that it takes up the rest of the board.
- Preferably not in the form of a question.

Title



Title

Vs.





Purpose

- The goal and summary of your experiment, i.e. the question your research seeks to answer in statement form.
 - Shouldn't be over one to two sentences.
 - It is one of the...

...**MAIN THINGS THE JUDGES READ.**



Introduction

- Gives background information on your project:
 - Literature search
 - Reasons for experimentation
 - How your project is unique
 - ****If you have any personal interest in the project, this is the place to give it.****



Hypothesis

- Your prediction of what will happen in the experiment.
 - Not a random guess – based on a scientific principle stated in the Introduction
 - Your hypothesis doesn't have to be correct. Wrong is just as good as right! Maybe even better!
 - Some projects don't need a hypothesis.



Procedure

- Description of how the experiment was performed
 - Writing style: past tense, passive voice, paragraph form.
 - Use a list only if there is a very compelling reason to do so.
 - Provide enough information so that someone could replicate your project!



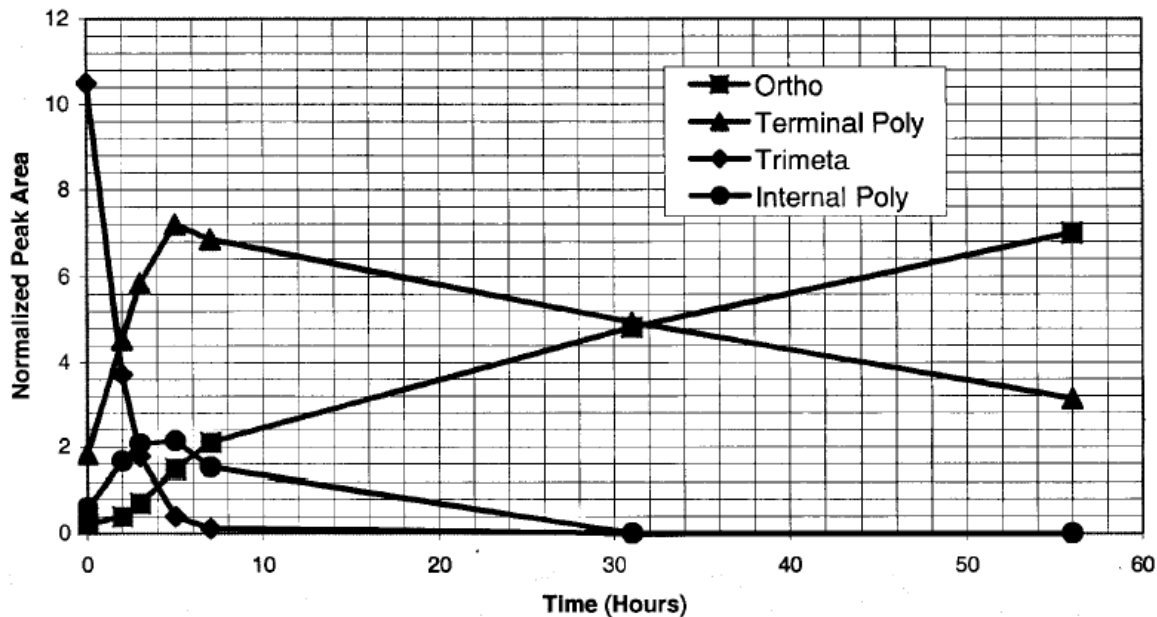
Procedure

An external reference standard was also made for the solutions. Approximately 50 mg of dibasic sodium orthophosphate were added to 1 mL of deuterated water. The pH of the standard was adjusted to 9 for the pH 1 solutions and was adjusted to 1 for the pH 7 solutions so the standard orthophosphate peak would separate from the standard's peak in the hydrolysis spectra. This solution was transferred into a NMR tube insert with a syringe or a pipet. This insert was then fitted into a 4mm NMR tube.



Results

- Observations from the experiment
 - Describes the data obtained, but does not explain them.
 - This is the place for graphs, tables, and numerical data obtained from your experiment.

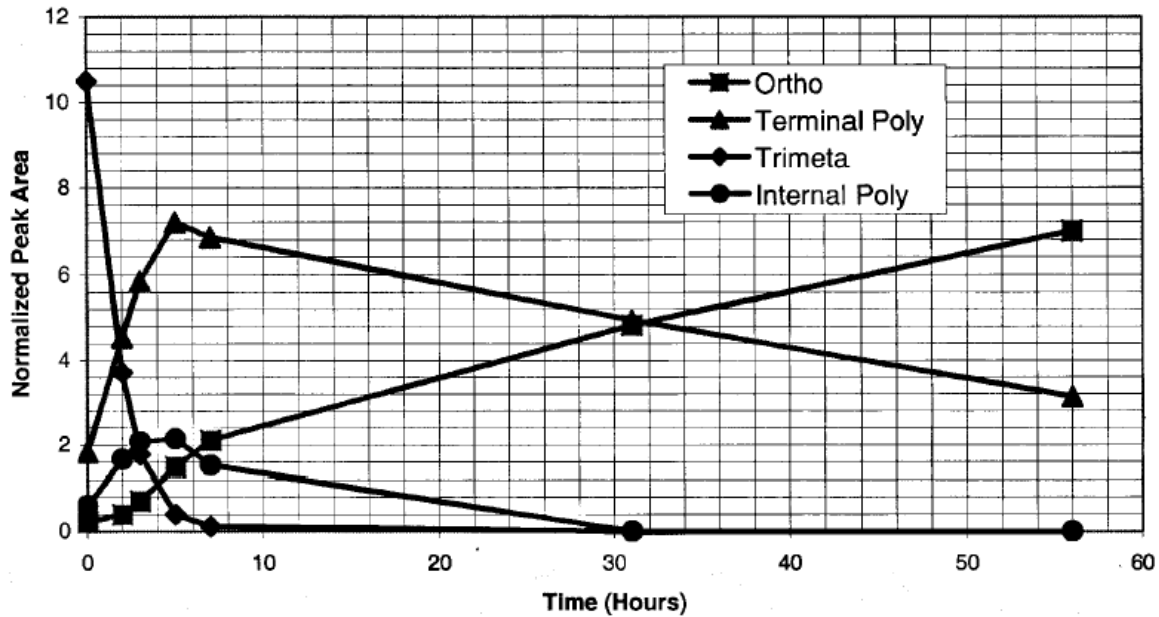


When the reaction began, only the peak representing trimetaphosphate rings was present. This peak, however, degraded very quickly and decayed almost completely in 10 hours. While this was occurring, peaks representing internal and terminal polyphosphate formed. These peaks grew in size until approximately 5 hours into the reaction and then slowly decayed throughout the remainder of the hydrolysis. Table 1 shows the trimeta breakdown to orthophosphate had a rate constant of approximately $3.3 \times 10^{-2} / \text{hr}$. Trimeta, however, had by far the shortest polyphosphate first order half-life of 1 hour.



Conclusions

- Interpretation of your results – explain what they mean!
 - This is where you decide what your project has shown, not proven.
 - Was your hypothesis correct?
 - Possible errors and future work.



The ring trimetaphosphate appears to

be split into tripolyphosphate very quickly. While this is occurring, the tripolyphosphate formed breaks down into pyrophosphate and orthophosphate.



References

- Remember the background information in the Introduction? This is where you cite this information.
 - *Internet sources are not adequate by themselves.*
 - Several major styles of listing exist...ask your teacher for the appropriate type.



Acknowledgements

- Actually, a fairly major point of contention when it comes to science fair displays.
 - Very appropriate for the paper
 - Questionable on the board
- ISEF does not allow acknowledgements on the board, including institution names



Abstract

- Paragraph-long summary of your project
 - One or two sentence introduction, one or two sentence procedure, remainder results and conclusions.
 - Should be the last thing done of your project!
 - Needs to be posted vertically on your board.
- It is one of the...

...MAIN THINGS THE JUDGES READ.



Part 3: The Package



The Challenging NMR Puzzle: Three Novel Antigenic Structures Elucidation

Introduction
Example Of Thinking Path: Cimberner PCM 1443

Results
Providencia -Juanj 049
Grodader PCM 1555
Cimberner PCM 1443

Chemical Structures:
i-chainol polyaacohalde
Two monomers

The poster features a central orange panel with a green circular flowchart illustrating the 'Thinking Path' of the NMR puzzle. The flowchart starts with a question mark in a green box, leading to various NMR spectra and chemical structures. The flowchart is surrounded by text boxes and diagrams. The poster is flanked by blue panels with text and diagrams. At the bottom, there are two ball-and-stick molecular models on a white table.

It's not as easy as 1-2-3

Limits of the human ability to count Jake Baron

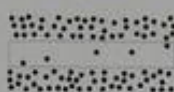
Introduction: How well can we count cluttered objects in the peripheral field of vision?

Human counting accuracy is well documented for centrally-viewed objects. Given a single glimpse, accuracy is perfect for up to 3 or 4 objects, but beyond that, error increases linearly with the number of objects viewed. One popular counting model supposes that two independent mental processes cover these two distinct domains: *subitizing* and *magnitude estimation*, respectively. But what happens to accuracy when objects are crowded (peripherally viewed and cluttered), as is common in everyday experience? Does the dichotomy of up-to-3 vs. 4-and-above still hold?

Methods & Results: For each task, fixate the + and estimate the number of dots in the box. When the dots are crowded, this is quite hard.

Five observers performed these three tasks 30 times each for every possible number of dots in the box, 1 through 30. The graphs on the right plot the standard deviation of each observer's 30 counts for each number of dots against the true number of dots. Each symbol represents an observer, and the colored lines represent the means of the five observers' standard deviations.

Task 1: Crowding



Task 2: Peripheral

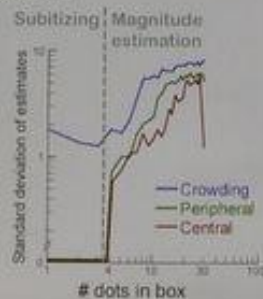


Task 3: Central



Conclusions: Crowding cripples subitizing, yet spares magnitude estimation.

The counting error data above are replotted here with logarithmic axes. This visualization highlights crowding's substantial impairment in counting accuracy for small numbers of objects.



When objects are crowded, we make errors counting even the smallest numbers: 1, 2, and 3.



Purpose

The purpose of this study was to determine the amount of lead in the water supply in the city of [City Name]. The study was conducted in order to determine if the water supply was safe for drinking. The study was conducted in order to determine if the water supply was safe for drinking.

Hypothesis

The hypothesis of this study was that the amount of lead in the water supply in the city of [City Name] was higher than the amount of lead in the water supply in the city of [City Name].

Background Research

Lead is a toxic metal that can cause serious health problems. It is found in many places, including old pipes, solder, and paint. Lead can get into the water supply through these sources. The amount of lead in the water supply can vary from place to place. The amount of lead in the water supply can vary from place to place.

ARE YOU AT RISK?

A Study of Lead in Drinking Water

Results of Study

The results of the study show that the amount of lead in the water supply in the city of [City Name] was higher than the amount of lead in the water supply in the city of [City Name]. The amount of lead in the water supply in the city of [City Name] was higher than the amount of lead in the water supply in the city of [City Name].

Table 1 - Summary Results

Location	Age of Home	Original Pipes	Lead in Water
1	1950s	Yes	High
2	1960s	No	Low
3	1970s	Yes	Medium
4	1980s	No	Low
5	1990s	Yes	High
6	2000s	No	Low
7	2010s	Yes	Medium
8	2020s	No	Low



Photo 1 - Lead in Water

Table 2 - Analysis & Lead Results

Sample Number	Location	Lead Concentration (ppb)
1	Sample 1	150
2	Sample 2	50
3	Sample 3	100
4	Sample 4	25
5	Sample 5	120
6	Sample 6	30
7	Sample 7	80
8	Sample 8	20



Future Studies

Future studies should focus on identifying the sources of lead in the water supply and finding ways to reduce lead levels. Future studies should focus on identifying the sources of lead in the water supply and finding ways to reduce lead levels.

Table 3 - Lead in Drinking Water

Age of Home	Lead in Water (ppb)
1950s	150
1960s	50
1970s	100
1980s	25
1990s	120
2000s	30
2010s	80
2020s	20

Reducing the Hazard of Lead in Drinking Water

There are several ways to reduce the hazard of lead in drinking water. These include using lead-free pipes, filters, and testing the water regularly. There are several ways to reduce the hazard of lead in drinking water. These include using lead-free pipes, filters, and testing the water regularly.



Photo 2 - Water Filter



Photo 3 - Lead in Water

Materials and Methods

The materials used in this study included water samples, lead testing kits, and laboratory equipment. The methods used included collecting water samples, testing for lead, and analyzing the results. The materials used in this study included water samples, lead testing kits, and laboratory equipment. The methods used included collecting water samples, testing for lead, and analyzing the results.

Discussion

The results of this study show that the amount of lead in the water supply in the city of [City Name] was higher than the amount of lead in the water supply in the city of [City Name]. The results of this study show that the amount of lead in the water supply in the city of [City Name] was higher than the amount of lead in the water supply in the city of [City Name].

Bibliography

The following sources were used in this study: [List of references]. The following sources were used in this study: [List of references].

Do Ginseng and Ginkgo Improve a Mouse's Memory ?

Hypothesis:
In this experiment the combination of ginseng and ginkgo will yield the greatest improvement in memory.

Purpose:
Determining if there is an improvement on the mouse's memory when given ginseng or ginkgo.

Prediction:
If ginseng and ginkgo prove to yield the greatest improvement in memory, then the mice of this group should progressively complete the maze at an increased rate.

Materials:
1. Twenty Lab Mice (Mice)
2. Liquid Ginkgo
3. Liquid Ginseng
4. Two 18 Gallon Aquarium Tanks
5. Paper Mice Mazes
6. Food Pellets
7. Scoop
8. A Water Control Tap



Procedure:

1. Divide two ten-gallon aquarium tanks into four five-gallon sections. Equal bedding, food, and water were put into each tank.
2. Divide twenty lab mice into four groups of five. The first group, the control, is given water with no additives over the three-week test period.
3. The second group is given water with fifteen drops of ginseng.
4. Group three was given fifteen drops of ginkgo.
5. Group four was given fifteen drops of both ginseng and ginkgo.
6. On February 14, 2004 the mice were ran through the maze for the 5th time prior to receiving any supplements. These times were used as a baseline.
7. The following day at the same time and everyday for three weeks the mice were ran through the maze and each group's time recorded and averaged in each group.
8. Fresh water and supplements were provided each day.



Analysis:
The hypothetical result that the combination of ginseng and ginkgo would show the most improvement in memory was incorrect. The experiment proved that ginseng alone resulted in the most memory improvement, while the hypothetical group followed. Thus, it can be concluded that ginseng is able to aid the mice's memories. Besides the groups which included ginkgo had the two best averaged times.

Conclusion: The results revealed the mice given only ginkgo had the most improved times over the three-week period. The ginkgo given the combination of ginseng and ginkgo had the second most improved times, followed by ginseng and water.





7

The Universal Wheelchair

An Omnidirectional, Stair Climbing, All Terrain Wheelchair

PROBLEM STATEMENT

RESEARCH

DESIGN OVERVIEW

EARLY DEVELOPMENT

BUILDING THE PROTOTYPE

TESTING CAPABILITIES

- POSTURE ADJUSTMENT
- NARROW PASSAGE NEGOTIATION
- SLOPE CLIMBING
- SLOPE DESCENDING
- GAP CROSSING
- OBSTACLE CLIMBING
- ROUGH TERRAIN MOVEMENT
- CURB CLIMBING
- CRACK CLIMBING
- STAIR CLIMBING

COMPONENT DESIGN

MOTION DESIGN

RESULTS

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Final Thought...

- Your board style and design is important, but not as important as:
 - The quality of your research
 - Your ability to communicate it when speaking to the judges.