Presentation and Project Layout Best Practices

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Welcome!

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Question:
Which of the following is MOST important for a strong AzSEF project?

A) Having a flashy, well-decorated board

B) Memorizing facts about the project

C) Demonstrating a deep understanding of the research process

D) Using expensive materials in the experiment

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Example Presentation Structure

1. **Introduction** – What problem are you solving? Why does it matter?
2. **Methods** – Briefly explain your research process.
3. **Results** – Highlight key findings, using visuals if possible.
4. **Conclusion** – What did you learn? What's the real-world impact?

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Communicating Clearly and Confidently

- Simplify complex ideas for clarity
- Show passion & ownership of the project
- Avoid scripted responses

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Preparing for the Interview

Common Interview Questions

- What was the inspiration behind your project?
- What challenges did you face during the process, and how did you overcome you?
- How does your project relate to real-world applications?
- What would you do next if you had more time or resources?
- Questions about methodology or results of your experiment or design

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Your Project Board: What to Include

Scientific Method	Engineering Design Process
• Title & Abstract • Research Question/Hypothesis • Methods & Procedures • Results & Data Analysis (graphs, charts, tables) • Conclusions & Applications • References & Acknowledgments	• Title & Abstract • Problem Statement & Engineering Goals • Background Research • Design Process & Iterations • Results & Performance Evaluation • Conclusion & Future Improvements • References & Acknowledgments

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Do’s and Don'ts of Board Design

Do’s	Don’ts
• Keep it simple and clean • Use high-quality visuals • Use color strategically • Check for grammar and spelling • Incorporate interactive elements if possible (check Display & Safety Regulations first)	• Don’t overcrowd board with text • Don’t use small/hard to read fonts • Don’t use irrelevant or excessive decorations • Don’t forget about the title • Don’t leave sections incomplete

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Display Board Example

OH CRACK!

Does the temperature of water when mixed with cement affect the strength of the concrete?

Purpose

In the construction field, it is important that all aspects of the job meet engineering specifications set forth, including the strength of any concrete used in a project. The purpose of this project is to find if the temperature of water when mixed with cement affects the strength of concrete. The information gained in this project will give contractors and concrete companies information on strengthening concrete.

Hypothesis

If concrete is mixed with hot water, warm water, or cold water, the concrete mixed with warm water will withstand the greatest pressure in pounds per square inch showing that it is the strongest.

Procedures

1.) collect materials
(Figure 1)
2.) Water Temperature
(Figure 2)
3.) Start mixing water
(Figure 3)
4.) Check consistency
(Figure 4)
5.) Fill molds
(Figure 5)
6.) Label molds
(Figure 6)
7.) Let cure
8.) Sit in water lime mixture
(Figure 7)
9.) After cleaning cylinder take diameter
(Figure 8)
10.) Place into seating blocks
(Figure 9)
11.) Put cylinders into hydraulic press
(Figure 10)
12.) Start breaking and recording data
(Figure 11-


Figure 1


Figure 2


Figure 3


Figure 4


Figure 5


Figure 6


Figure 7


Figure 8


Figure 9


Figure 10

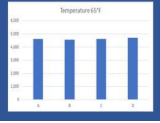

Figure 11

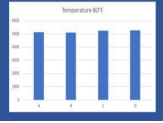

Figure 12

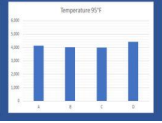

Figure 13


Figure 14


Figure 15



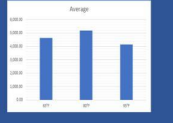




	Test 1	Test 2	Test 3
	Water Temp: 65 Concrete Temp: 66	Water temp: 80 Concrete temp: 81	Water temp: 95 Concrete Temp: 84
Mold A	Type: 4 PSI: 4,630	Type: 3 PSI: 5,140	Type: 4 PSI: 4,140
Mold B	Type: 4 PSI: 4,570	Type: 4 PSI: 5,100	Type: 3 PSI: 4,020
Mold C	Type: 5 PSI: 4,610	Type: 2 PSI: 5,230	Type: 3 PSI: 4,000
Mold D	Type: 2 PSI: 4,720	Type: 2 PSI: 5,270	Type: 4 PSI: 4,430

Conclusion

The water temperature did have an affect on concrete strength. It changes the amount of pressure measured at pounds per square inch in which the concrete can withstand. The testing did show the hypothesis to be correct: the middle range "warm" water concrete was stronger than the cooler and hotter water concrete. The concrete made with 65^{0}F water showed on average that it can withstand 4,632.5 pounds per square inch. Similarly, the concrete mixed at 95^{0}F water had an average of 4,147.5 pounds per square inch. With a slightly higher average of 5,185 pounds per square inch, the concrete mixed at 80^{0}F water is stronger



Display Board Example

Heavy Metal Water

Introduction

There are over 100,000 abandoned mines in the state of Arizona. Most of the abandoned mines contain toxic chemicals which may enter our ecosystem. As it rains, water can cause the mines to expose contaminated leakage into water resources which can affect the local habitat, livestock, and water quality. These chemicals can cause damage to animal and human respiratory systems as well as damaging skin and eyes if contact is made.

Why is this important?

The purpose of this project is to determine if water from the "Lead Queen" mine in Patagonia, AZ, is contaminated with enough heavy metals to affect the surrounding environment. The results from this project can be used by the United States Forest Service, surrounding ranchers/farmers, and local homeowners. The U.S. Forest Service can use the data to make improvements. Ranchers can monitor the wellbeing of their livestock, and homeowners can make sure their water quality is up to par. There is only so much that the Environmental Protection Agency (EPA) can do to control the contamination, so it is very important that people recognize the potential hazards around their environment and community.

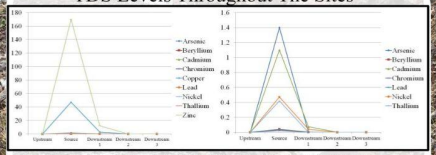
What Did We Do?

At the Patagonia location, a surface hydrologist from the United States Forest Service gave information about the "Lead Queen" mine. Water measurements and samples from five different water sites were taken near the mine.

- The first site was upstream, about 100 meters before the water converges with the contaminated water from the mine.
- The second site was the source of the contamination (the water leaking from the mine).
- The last three sites were downstream, after the water passed the source contamination.

At each site, we measured the water's salinity, conductivity, TDS, pH, temperature, and dissolved oxygen.We also collected two samples from each site for further lab testing at TestAmerica to find the total metals and the dissolved metals. We also approached community service groups to help fund the cost of lab testing.

TDS Levels Throughout The Sites



Theses two graphs represent the concentration of the total dissolved metals through the sites. Graph one is shows all the metals and graph two is a zoomed in scale of all the metals except zinc and copper(since their values are really high compared to the rest of the metals).

Measurements	Upstream	Source	Downstream 1	Downstream 2	Downstream 3
Conductivity	162.7	3.54	968	683	609
Salinity	72.0 ppm	7.40 ppm	449 ppm	300 ppm	277 ppm
TDS	116 ppm	5.8 ppm	681 ppm	482 ppm	433 ppm
pH	8.25	2.88	4.79	8.64	8.43
Temperature	6.5 °C	8 °C	7.4 °C	7.4 °C	8 °C
Dissolved Oxygen	10.77 mg/L	3.71 mg/L	10.99 mg/L	10.63 mg/L	10.33 mg/L
Velocity	0.3 ft/s (8.49564 L)	0.92 ft/s (26.051456 L)	1.13 ft/s (31.997984 L)	0.65 ft/s (18.40592 L)	0.52 ft/s (14.724736 L)
Depth	-	0.07 ft	0.014 ft	0.14 ft	0.14 ft
Width	-	0.3 ft	0.15 ft	0.95 ft	0.85 ft
Shape	-	Triangular	-	Rectangular	Rectangular
Latitude	31. 484682 N	31.484711 N	31.484727 N	31.487563 N	31.487563 N
Longitude	110.720391 W	110.720018 W	110.719738 W	110.710046 W	110.708123 W
Altitude	4871.8 ft	4827 ft	4827 ft	4623 ft	4580 ft
Horizontal Accuracy	16.5 ft	16.5 ft	16.5 ft	16.5 ft	16.5 ft
Vertical Accuracy	9.9 ft	13.2 ft	10 ft	13.2 ft	13.2 ft

Results

The bar graphs below show the exceeding levels of TDS throughout the streams along with the EPA standards. These represent how much the samples from the stream exceeded the hazard levels.

In comparing the acute and chronic levels of the EPA standards for aquatic and wildlife (A&W), we have determined:

- Most of the stream contained acute levels of copper.
- The source site had acute and chronic levels in cadmium, chromium, copper, lead, zinc and nickel.
- Downstream 1 had chronic levels of cadmium as well as chronic and acute levels of copper, nickel, and zinc.
- Downstream 2 didn't show high levels of any metals.
- Downstream 3 had chronic levels of chromium and chronic and acute levels of zinc and copper.

Downstream 2 had no detected TDS. However, downstream 3 had detectable TDS, which may suggest that contaminated tributaries converged with the main stream.

The Bigger Picture

In conclusion, we were able to prove that the water coming from the mine has hazardous levels of metals, which may affect animals and the environment in a negative way. Since there is no barrier that prevents animals from reaching the water with higher contamination levels, on days when it rains there is an increased risk of toxic consumption.

We hope that in doing this experiment, people will become more aware of the pollution in their environment. Perhaps we can start a program that will encourage others to do similar testing in their areas.

There were several errors in this experiment. Because it is in nature and nothing is ever the same, the metal could've been concentrated in certain areas that our testing didn't cover. Metal is heavier than water, meaning the metals should've been at the very bottom of the stream. All of these errors could be corrected by taking more samples, in a broader area.

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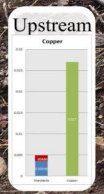
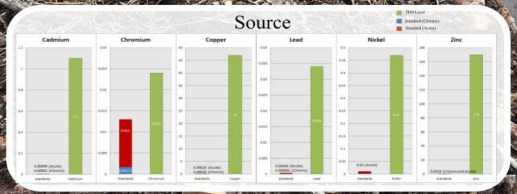
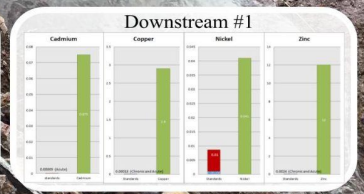
Upstream



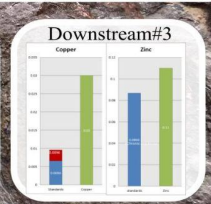
Source



Downstream #1



Downstream#3



Display and Safety Regulations

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Display and Safety Changes for 2025

- ALL images must be **cited independently**. NO blanket statements.
- Senior division: Quad charts- **max 75 words per quad.** It is a visual representation of the project.
- **AI detection tools** will be utilized to reduce the chance of plagiarism.

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Final Checklist Before the Fair

- Reviewing the project one last time
- Mock judging sessions
- Confidence, enthusiasm, and preparation are key! Practice practice practice!

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Office Hours

During the registration period, students, teachers, and parents have the opportunity to join and ask questions about registration, project materials & submission, and paperwork.
All Office Hours will be from 4-5 p.m.

- Elementary & Junior DIvision Dates
  - February 17
  - March 3
  - March 11

- Senior Division Dates:
  - February 10
  - February 24
  - March 10

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Thank You!
Questions? Contact petersenj@azscience.org