2016-2017 Science Olympiad SSSS TEST #1

By: Cemsc10

Water is an important resource, one whose importance is often overlooked. Your task for today is to create an experiment displaying any property of water (examples include PH,etc.)

GOOD LUCK!

Materials Given:	Materials at Distribution Center:
Tape Sugar Two 250 ml Graduated Cylinders Thermometer 3 Straws Scissors Salt Plastic Cup Styrofoam Cup	Water (Cold, Hot, and RT) PH indicator Yarn Refills of any supply given at start (see left box) Lemon Juice Cola Vinegar Coffee Tea Milk Bleach Ammonia Soap

PAPER TOWELS WILL BE GIVEN OUT FOR CLEAN-UP; FAILURE TO CLEAN WORK AREA WILL RESULT IN A FIVE POINT LOSS.

Write up must include: (Look at Point Values)

Statement of Problem (4 points)

Hypothesis (8 points)

Independent, Dependant, and Controlled Variables (20 points)

Standard of Control (4 points)

Materials (6 points)

Procedure (12 points)

Qualitative Observations (8 points)

Quantitative Observations and Data Table (12 points)

Graphs (12 points)

Statistics (6 points)

Analysis (8 points)

Possible Errors (6 points)

Conclusion (8 points)

Applications for Further Use (8 points)

2016-2017 Science Olympiad SSSS TEST #2

By: Cemsc10

Task: Create an experiment centered on viscosity. GOOD LUCK!

Materials Given:	Materials at Distribution Center:
Glue (Elmer's Brand) Water Honey Syrup Tea Egg Whites 3 Graduated Cylinders (250 ml) Spoons Thermometer	Bunsen Burner (We will heat things up for you) Refills of any supply given at start (see left box)

MAKE SURE TO CLEAN UP AFTER YOURSELF, AND LEAVE YOUR WORK AREA LOOKING LIKE IT DID WHEN YOU ARRIVED! FIVE POINTS WILL BE DEDUCTED FOR ANY TEAM THAT FAILS TO FOLLOW THESE DIRECTIONS.

Write up must include: (Look at Point Values)

Statement of Problem (4 points)

Hypothesis (8 points)

Independent, Dependant, and Controlled Variables (20 points)

Standard of Control (4 points)

Materials (6 points)

Procedure (12 points)

Qualitative Observations (8 points)

Quantitative Observations and Data Table (12 points)

Graphs (12 points)

Statistics (6 points)

Analysis (8 points)

Possible Errors (6 points)

Conclusion (8 points)

Applications for Further Use (8 points)

2016-2017 Science Olympiad SSSS TEST #3

By: Cemsc10

Task: Perform an experiment centered on the topic of surface tension.

GOOD LUCK!

Materials Given:	Materials at Distribution Center:
Pennies Dimes Quarters Pipette (Water is at distribution center to avoid messes)	Soapy Water Room Temperature Water Hot Water Cold Water Refills of any supply given at start (see left box)

MAKE SURE TO CLEAN UP AFTER YOURSELF, AND LEAVE YOUR WORK AREA LOOKING LIKE IT DID WHEN YOU ARRIVED! FIVE POINTS WILL BE DEDUCTED FOR ANY TEAM THAT FAILS TO FOLLOW THESE DIRECTIONS.

Write up must include: (Look at Point Values)

Statement of Problem (4 points)

Hypothesis (8 points)

Independent, Dependant, and Controlled Variables (20 points)

Standard of Control (4 points)

Materials (6 points)

Procedure (12 points)

Qualitative Observations (8 points)

Quantitative Observations and Data Table (12 points)

Graphs (12 points)

Statistics (6 points)

Analysis (8 points)

Possible Errors (6 points)

Conclusion (8 points)

Applications for Further Use (8 points)

2016-2017 Science Olympiad SSSS TEST #4

By: Cemsc10

All throughout school, we are taught the fundamentals of math, including both area and perimeter. This is your chance to apply those basic skills, in an experimental format. Your topic can be either Area or Perimeter, and you cannot alter any of your supplies.

GOOD LUCK!

Materials Given:	Materials at Distribution Center:
2D Circles in Various Sizes 2D Squares in Various Sizes 2D Triangles in Various Sizes Ruler Calculator	Refills of any supply given at start (see left box)

MAKE SURE TO CLEAN UP AFTER YOURSELF, AND LEAVE YOUR WORK AREA LOOKING LIKE IT DID WHEN YOU ARRIVED! FIVE POINTS WILL BE DEDUCTED FOR ANY TEAM THAT FAILS TO FOLLOW THESE DIRECTIONS.

Write up must include: (Look at Point Values)

Statement of Problem (4 points)

Hypothesis (8 points)

Independent, Dependant, and Controlled Variables (20 points)

Standard of Control (4 points)

Materials (6 points)

Procedure (12 points)

Qualitative Observations (8 points)

Quantitative Observations and Data Table (12 points)

Graphs (12 points)

Statistics (6 points)

Analysis (8 points)

Possible Errors (6 points)

Conclusion (8 points)

Applications for Further Use (8 points)

2016-2017 Science Olympiad SSSS TEST #5

By: Cemsc10

There is no topic for this test, and you may use your creativity to create an experiment of your choosing! Have fun and GOOD LUCK!

Materials Given:	Materials at Distribution Center:
String Tape Scissors Washers Salt Vinegar Baking Soda Balloons Paper Cardboard Sponges Popsicle Sticks Three candy mints (do not eat)	Hot water Cold water Graduated Cylinders Refills of any supply given at start (see left box)

MAKE SURE TO CLEAN UP AFTER YOURSELF, AND LEAVE YOUR WORK AREA LOOKING LIKE IT DID WHEN YOU ARRIVED! FIVE POINTS WILL BE DEDUCTED FOR ANY TEAM THAT FAILS TO FOLLOW THESE DIRECTIONS.

Write up must include: (Look at Point Values)

Statement of Problem (4 points)

Hypothesis (8 points)

Independent, Dependant, and Controlled Variables (20 points)

Standard of Control (4 points)

Materials (6 points)

Procedure (12 points)

Qualitative Observations (8 points)

Quantitative Observations and Data Table (12 points)

Graphs (12 points)

Statistics (6 points)

Analysis (8 points)

Possible Errors (6 points)

Conclusion (8 points)

Applications for Further Use (8 points)

TIPS FOR EXPERIMENTAL DESIGN

1. The most important tip in my opinion is to memorize the rubric. The sections of the rubric that you are given in invites usually just contain broad words, such as “conclusion”. The actual rubric has several bullet points that you need to hit, and knowing these by heart makes you a better competitor. At one tournament, I was just given five blank sheets of paper, and if I hadn’t known the rubric, I wouldn’t have known what to do. So keep this in mind while studying.
2. Don’t have your entire group doing each step together. In order to succeed in this event, you must be able to rely on your team members. The layout we always used was two of the members conducted the experiment, meaning they had to do the observations, graph, and conclusion. The other member would fill in all the info, such as the hypothesis and variables.
3. Always give details, judges prefer having specifics on your experiment rather than a couple of basic bullet points. At one invite I forgot what one of the specifications was for one of the rubric sections. I simply addressed what I knew and made sure to give lots of extra detail since I had the time to. I ended up covering the item I forgot, without having known what it was. Also if there is a tie, the judges are more likely to go for the well-written and detailed response, than the messy and unclear response.
4. Do not try to have the most unique experiment ever. The judges don’t care how creative your idea was if it was not carried out the right way, and does not cover what the rubric would like. Experimental Design is graded on how you carry out the experiment and the results, not on whose idea was the best. Only spend 5-7 minutes at the most trying to think of an experiment, as the time allotted goes by very quickly.
5. Practice with your team members as often as you can. You cannot expect to do well if you have never practiced as a team, and do not know who is doing what during the experiment. You need to be able to work efficiently and quickly together, to get the job done. I think that even if you dislike who you’re working with, you can still do well as you’ll all care about the team overall doing great, which is what will bond you in the end.

GRADED EXAMPLES

In my opinion, Applications for Further Use is one of the tougher specifications to cover. If you have not studied the rubric, your answer may be nowhere near what the judges wanted. This section is worth 8 points, and is usually done last, when the time is at its lowest. This may seem like a harder section to answer, but here are some graded examples and how to make your response better.

The specifications for this section are:
Suggestions for improvement of specific experiment are given (2 points)

Suggestion for other ways to look at hypothesis given (2 points)

Suggestions for future experiments given (2 points)

Practical application(s) of experiment given (2 points)

ALL RESPONSES ARE BASED OFF OF EXPERIMENT #3 (SEE ABOVE)

RESPONSE ONE: 0 points/ 8 points

Our hypothesis was supported, as we believed that the room temperature water would have a greater surface tension, and it did. We conducted three trials, and had no outliers, since the average was 28 room temperature drops, and 10 soapy drops, and most of the data points were around those numbers.

This response would be given no credit, as it does not cover anything it is supposed to, and would have been better in the conclusion section. Even if it was there, it still needed revising, as not everything required is hit in either "Conclusion", or "Applications for Further Use".

RESPONSE TWO: 4 points/8 points

Our data showed that the room temperature water had a greater surface tension than the soapy water. In the future, experimenters should use more materials so that they can test surface tension of more things. Our experiment could have been improved if we had more time, to do more trials, or if we were careful to do

only one drop at a time, since sometimes the pipette released more than one but we still counted it as one. This may have skewed our data.

This response only covered two bullet points, as they only gave suggestions for future use and improvements of their experiment. This may be someone who was not aware of what they needed, since the title "Applications for Further Use" implies an answer more like this one. This person needed to explain a practical application of this experiment, and another way that they could have looked at the hypothesis.

RESPONSE THREE: 8 points/8 points

After experimenting, we figured out that the room temperature water had a greater surface tension than the soapy water. Our experiment did contain some bias however. We switched roles when using the pipette to conduct the experiment, and our experiment could have been improved if we had stuck to the same person. In the future, experimenters should also be careful to not change to many variables, as we almost used the wrong coin in one of our tests. They should also make sure that the experimenter is kept the same in each trial. I think a practical application could be made to those who study insects, as some are able to float on some areas, but not others. The surface tension of the liquid is what affects this, and some may find this useful when studying these creatures. Another way we could have looked at our hypothesis is by using another surface to test whether the room temperature water had a greater surface tension, such as the top of a bottle cap, or a cup. We could have filled the cup and saw how many drops we could add even after it was full, since the glass has the little bubble of surface tension even when full. In conclusion, the experiment could have been improved in many ways.

This is an example of a response that was given all 8 points, meaning each specification was fulfilled. It may have been quite long, but it still covered what was needed, and exceeded beyond that. This was actually my response in a test, and this is the grade I got. To be fair, I had 5-10 minutes left, and usually like to write long paragraphs. ☺