

Somers Intermediate Hands On Science Night Handbook

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INTRODUCTION

Contrary to the traditional cookie-cutter science fair, the objective of this night is not simply to learn the scientific method and how to present it to adults, our goal is to allow the kids to have fun and physically see what they are talking about. By giving the kids the freedom to do science hands on, they are given the chance to understand and get excited *while* learning about the scientific method and how to convey their project.

Furthermore, the older students (5th grade) are able to take on a teaching role by presenting their projects to the younger students (3rd and 4th graders). The 5th graders are the “Demo Leaders” who pass out the materials, cover procedure and safety rules, and then prompt conclusions from their attendees.

THE COMMITTEE

The committee will be the essential board of adult volunteers responsible for organizing the science night and aiding the demo leaders in their progress through their projects. A committee of 3-5 people is optimal and recommended.

The roles are (obviously one person could perform more than one role)

Science Coordinator - leads demonstration showcase, reviews experiments, advises students, etc

School Coordinator - manages affairs with the school, room reservations, setup for rehearsal afternoon and science night, audio equipment, etc.

Publication Coordinator - sends emails and reminders for meetings, printing, advertising, etc

Student Coordinator – deals with anything related with students, permission slips, pizza (for snacks during meetings), shirts, and most important registration process for participants

Judge Coordinator - manages judging process, including recruitment of judges, successfully handled through a high school student in an AP Science course

Volunteers Coordinator - recruits volunteers for all events

THE KICKOFF

The objective of the first meeting is to give both the parents and the kids an overview of what the program is like. This is the meeting in which a schedule is discussed with the parents and the format in which the actual science night will work is explained. By elucidating what a hands-on science experiment is, we hope to inspire the kids and kick their imaginations into gear.

Start by explaining how the science night works:

- The 5th graders, or ***Demo Leaders***, are working towards a night in which they will spend their time explaining and demonstrating their projects to 3rd and 4th graders, the ***Participants***, who choose to attend.

- Each Demo Leader team will have a station with 6-7 chairs and 2 tables to host their Hands On experiment and poster board.
- The participants will rotate around every 15 minutes, visiting 7 stations, The Demo Leaders will be presenting 6-7 times depending on attendance.
- The Demo Leaders may also opt for 3 separate judges to oversee their presentation throughout the night. These judges, who are preferably high school students will rate the Demo Leaders based on their projects' different high or low points. The top projects will become eligible to enter in the Tri County Science Fair competition representing their school.

For the actual project, Demo Leaders are encouraged to join up in teams of 2 or 3, teams of 1 person would be allowed based on (physical) space availability. Now, the demo leaders are able to take two different paths for their projects. Either they can pick from one of several pre-planned demonstrations involving the areas of States of Matter, Chemistry, Polymers, or Algorithms. Links to such options are available on

http://researcher.watson.ibm.com/researcher/view_project_subpage.php?id=2110 .

The demo leaders may also chose to find or design their own project. Should they need to use any slightly hazardous materials in their projects, parents should be warned that MSDS sheets will be required to be on site. See Safety section.

A schedule of when the kids will meet up to further their work on the science night should be explained to parents. Also, a permission slip will be handed out on this first day. An example is attached at the end.

EXPERIMENT SHOWCASE

The second meeting is an hour filled with fun science demonstrations that will allow the Demo Leaders to get a full idea of what hands-on science means. These prospective demo leaders will get to watch examples of what their experiments should look like, which will hopefully inspire and excite them. Suggested experiments are Color chromatography, Bases and acids, Map coloring and Ooblek. Links to these ideas and others can be found at

http://researcher.watson.ibm.com/researcher/view_project_subpage.php?id=2110 .

RESEARCHING YOUR EXPERIMENT

When researching their experiments Demo Leaders should keep in mind two things: that they want to utilize and work through the scientific method and that they are doing a demonstration for participants who they want to keep engaged, and wow!

Through this science night, we hope the students will come to be familiar with the scientific method. They should be able to see that the scientific method is a way to answer questions through observations and doing experiments. The idea in scientific method is to isolate and manipulate one variable or aspect of the project while keeping all other conditions the same. Finally, students should be taught the process of the scientific method. Specifically, the steps of the scientific method are:

1. Ask a question
2. Do background research
3. Construct a Hypothesis
4. Test Your Hypothesis by Doing an Experiment
5. Analyze Your Data and Draw a Conclusion
6. Communicate Your Results

Here are some good websites for researching projects:

<http://www.sciencebuddies.org>

http://researcher.watson.ibm.com/researcher/view_project.php?id=2109

<http://www.sciencebob.com>

<http://www.stevespanglerscience.com/experiments>

SUBMITTING PROPOSALS

Submissions can be done in a number of ways. We at the Somers Intermediate School chose to do submissions through weebly.com. The idea is that students create a web page that walks through their experiment and thus the Science Coordinator can judge whether or not the experiment will work well in the hands-on program, and recommend any fine tuning to the experiment. The web page also serves as documentation of the project and for reference for future Hands On Science Nights.

<http://scinight.weebly.com> contains the projects for recent Science Nights at Somers Intermediate School – be sure to navigate the different menus.

For the format of their web pages, students must explain each step of the scientific method. Thus they should state their question and explain it in detail with any necessary background information. Next is the hypothesis and materials. Before the demo leaders move on to explain their procedure, they must mention any safety hazards or safety procedures to be aware of in their experiment. Then the demonstrators will go on to write about their procedure, explanation. About the authors, pictures (of both the kids and their procedure)

It is important to also highlight any special needs for the projects such as water, electricity, fire extinguisher, flooring, etc.

The page is intended to evolve and include results, analysis, and conclusions. Pictures and videos of the journey are also encouraged.

PROJECT REVIEWS and POSTER BOARD GUIDELINES

It is the job of the Science Coordinator and any other adult committee members to review projects. When reviewing the web pages and project ideas, committee members should look to make sure a number of requirements are being met. Firstly, make sure the kids accurately and thoroughly use the scientific method; their experiment should start with a question that is both demonstrated and explained through a physical example. They should be able to prompt their participants into an accurate conclusion at the end of their demonstration. Secondly, there should be a wow factor. Even though the demo leaders need to be scientific and well-researched, their experiment should not be too information heavy or boring. They are presenting to 8-10 year olds and thus need to keep their attention. This leads to another factor which is whether or not the project is hands on. The participants should be able to touch, see, and do the experiment. The more involved the participants are the better. With this aspect, Demo Leaders must keep in mind safety restrictions.

Finally, the project should be designed with a time limit in mind. Because all participants will be rotating throughout the science night to see other projects, projects should be about 12 minutes long. If the project seems too long, the Demo Leaders should look at what they can cut down or pre-assemble before each round, or whether they should look for another project. Once the science night board has approved the experiment, students may proceed to create their poster board, plan the presentation, acquire materials, and rehearse.

SAFETY FIRST

Safety of participants and Demo Leaders alike should be at the forefront of every experiment. Every experiment should be fun and safe.

Demo Leaders are encouraged to provide safety goggles, gloves, or lab coats, and other handling devices whenever is appropriate

Demo Leaders must understand the safety procedures for handling any materials and what to do in case of exposure.

Demo Leaders must provide the MSDS sheets (in printed form) for any chemical that is in raw form, and not usually found in a household cabinet. MSDS sheets describe the precautions

and treatment procedures to follow for a particular material. They usually can be found in the internet or from the provider of such material.

Fire extinguishers must be available to any experiment that uses matches or hot plates. Use of matches should be allowed as long as the flame is in control at all times. Flying flames, bonfires, explosions are not allowed in any way. Heating of any material must be time or temperature controlled. Note that many Science Fairs will not even allow the presence of open flames or hot plates, consider this if you expect to move on to the next round.

The Science Night Committee reserves the right to refuse any experiment they deem unsafe for any reason.

ATTENDEE REGISTRATION

The students who will be attending the science night and participating in the 5th graders' demonstrations will be the 3rd and 4th graders of the school. The idea is for the 5th grade demo leaders to get to present their projects at 6-7 times to different groups of 7 or less kids, all in 3rd or 4th grade, if space permits exceptions may be made for siblings of demo leaders. To call for attendees, you may want to have an announcement made in the morning at the school and to mass e-mail to the parents of the 3rd and 4th graders. The participants may enroll by online registration in the Science Night site.

SCIENCE NIGHT REHEARSAL AFTERNOON

Before the actual science night, there should be a rehearsal for the Demo Leaders to practice their hand at demonstrating for an audience and also to test where their project needs improvement.

This rehearsal could take place after school in a 2 hour period, **pizza and snacks** preceding the event are highly recommended.

It is suggested to set up rooms of about 5 projects each. The kids may then take presenting their project to the other 4 teams of demo leaders. There should also be 2 reviewers with a comments sheet with a section for each of the categories the students will actually be judged on at the science night. The reviewers are encouraged to talk to the teams afterwards and to leave generously detailed feedback for them. They should also fill out a similar sheet for the organizers of the science night. Thus the organizers can may sure changes that need to be made are adjusted with the projects. Also, this will help the organizers coordinate the projects the participants' view, so the participants aren't watching similar demonstrations. The Demo Leaders should also be warned if their project is not within the time limit of 12 minutes.

For the rehearsal night, it is important to note that our reviewers were high school students and a few teachers. These high school students would be part of the same team of high school students doing the judging for the science night, thus be careful that the students do not judge the students that they gave advice to previously. This rule is just to ensure impartiality. Our judges were AP science students who would receive community service for judging the science projects.

Please see appendix for an example of a Rehearsal Afternoon Project Review form.

HANDS ON SCIENCE NIGHT

Within a few days of the rehearsal afternoon should be the actual science night. Students should arrive about 45 minutes before the participants arrive. It should be predetermined where each project will be set up and it is advisable that the School Coordinator have a master map of the school including where each project is. Based on past experience, it may also be helpful for this map to be available for the parents of the 3rd and 4th grade participants. Each demo leader team should have a station with two tables with which to set up their poster and the materials for the hands on part of their experiment. There should be at least 7 chairs for the participants. It may be hospitable to provide some chairs for the parents. When the participants arrive, they should be checked in at the front door and handed a “passport”. This passport will direct them where to go throughout the evening. It should include the experiment names, the area each team is in such as “Front of small gym” or “Art classroom”, and in what order they will be going to each demo. The participants should then be directed to a large area in which, once most of the participants have arrived, the organizers will introduce the night, the demo leaders, and how the night will work. If the demo leaders came to the start-off meeting, be sure to let them leave before the participants. Using the same intercom that the schools announcements are made with, you may choose to issue a chime or a bell that will tell the participants that the 15 minutes are up and they should find their next demonstration. This is much like how participants know their period is over and to go to their next class. Figure 1 shows an example of a passport.

Team	Helium - 2	
Session	Room	Demonstration
7:00 PM	Cafeteria	Welcome
7:15 PM	5th Grade Great Room	Stacking Liquids
7:30 PM	4th Grade Great Room	Water Filter
7:45 PM	Cafeteria: Front left	Pop Rocks and Soda
8:00 PM	Cafeteria: Rear right	Magnetic Levitation Train
8:15 PM	Gym: Front	Elephant Toothpaste II
8:30 PM	Gym: Middle	Lemon Battery
8:45 PM	Gym: Rear	Boomerang Can

Figure 1 : Passport example

JUDGING

During the Science Night, you may also want to have judges for the students' projects. Our judges were high school students in APca science classes. Each judge was in charge of judging 3-4 projects. The judges were not to be at the same project at the same time as another judge and it is encouraged for the judges to see a variety of projects. The judges' projects, like the participants, were predetermined and thus they were also given "passports" although the judges' passports had the judging sheets attached which they filled out after each presentation. Judges should not be intrusive, but rather should watch the kids interact and hold their questions until the end. Each project was viewed by 3 different judges. Judging forms were handed in (to a specific organizer) at the end of the night.

Votes were tallied shortly after the end of the night, and winners identified according to the requirements of the fair that the students were attending next. Emails and public announcements were done to announce the winners.

Please find an example of the judging forms in the appendix.

WRAP UP

After the excitement of the Science Night is over, there are a few loose ends to tie.

Gather feedback from Demo Leaders and participants to see what can be done better in the future. Survey Monkey is a convenient way to build a survey and easily distribute to the participants.

Registration and preparation for Tri-County: Address the registration of the designated winners into the follow-on Science competition. Provide feedback, from judges and committee on poster and presentation.

Completing their Web pages: Teams are encouraged to complete their websites with pictures and videos from Science Night, as well as any other results and conclusions of their experiment. To encourage this effort, a contest for the best pages (1-3 teams) may be announced.

Certificates of Participation: Demo leaders have been recognized at a Town Hall meeting, certificates of participation were handed to the Demo Leaders, and those that had the best web page.

A TYPICAL TIMELINE

Kickoff Meeting	
Experimental Showcase	
Introduction to Weebly	
Project Submission	
Project Review and Poster Board Guidelines	
Early Presentation I	
Early Presentation II	
Rehearsal Afternoon	
Hands-On Science Night	

APPENDICES

Find in the next few pages the following appendices

1. Permission Slip
2. Rehearsal Afternoon Project Review Form
3. Evaluation Form for Judges



Dear Parents/Guardians,

December 12, 2012

By attending an informational breakfast today, your fifth grade child has indicated an interest in participating in the SIS PTA Hands-on Science Night on Wednesday, March 20th. (Snow date: 3/21) At the event, your child will present and teach a hands-on science demonstration to small groups of SIS students.

During today's informational meeting, interested students that want to participate as Experiment Leaders were offered two choices to select an experiment:

1. **Pick from our Favorites:** Students will work with a Science Mentor* on a predetermined science project in the areas of States of Matter, Kitchen Chemistry, or Polymers. They will learn the project, prepare a display and teach it hands-on to fellow SIS students at Hands-on Science Night.
2. **Pick your Own:** Students will work on a science project of their choice. They will learn the project, prepare a display and teach it hands-on to fellow SIS students at Hands-on Science Night. A Science Mentor (*) will be available to advise the team to ensure the project fits into the framework of the event.

Fifth grade students are encouraged to team together in pairs to teach the lesson, if they would like to. (If your child would like to work alone, that's OK, too. We have just found that pairs seem to be a good division of labor.)

Please let us know on the permission slip on the next page which type of experiment your child will do.

(*) Science Mentors are Scientists and Engineers from the Somers Community or recommended scientists from IBM, bringing to bear their experience and knowledge to direct students to a successful and fun project.

Also discussed at today's informational breakfast:

Before School Science Club: The Goal of the Science Club is to develop a complete science experience for our 5th graders, from the concept of an experiment to the demonstration in Science Night. The Science Club will meet once a week before school to participate in science experiments and help each team select one that they would like to develop further. Coming to the club sessions will help the students to prep for Science Night with their teammates and adult helpers.

Teams will use weebly to enter their proposal, blog their science experiments and continue to build the Science Night Website scinight.weebly.com .

Advancing to the The Tri County Science and Technology Fair, to take place on April 20th, 2013 at the White Plains High School. Teams are welcome to submit their experiments for evaluation towards participating at this competition. Teams will be considered with the following

TEAM#:

Rehearsal Afternoon Project Review Form

Rehearsal Afternoon Project Review

Project Title:

Facilitator:

Tri-County	
Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

Timing			
Presentation Duration (minutes):			
Demonstration			
	Yes	No	Comments
Covered Introduction, problem, hypothesis/guess	<input type="checkbox"/>	<input type="checkbox"/>	
Safety Guidelines? Did they observe them?			
Enough instructions for students to perform the experiment?			
Enough hands-on or novelty to keep students engaged			
Set / Reset			
	Yes	No	Comments
It is clear to the team how to clean-up and reset for the next session	<input type="checkbox"/>	<input type="checkbox"/>	
Can clean-up and reset be done in 2-3 minutes?	<input type="checkbox"/>	<input type="checkbox"/>	
Was there any mess?	<input type="checkbox"/>	<input type="checkbox"/>	
Was the mess managed and easy to clean-up?	<input type="checkbox"/>	<input type="checkbox"/>	
Poster Board			
	Yes	No	Comments
Is poster board clear and well organized?	<input type="checkbox"/>	<input type="checkbox"/>	
Is title visible?	<input type="checkbox"/>	<input type="checkbox"/>	
Safety Guidelines, if applicable, clear?	<input type="checkbox"/>	<input type="checkbox"/>	
Was the poster used to help the presentation?	<input type="checkbox"/>	<input type="checkbox"/>	
General Comments:			

Evaluation form for Judges

PROJECT:	TEAM:	JUDGE:
Creativity: ● Use of materials ● Design ● Adapts and Improvises ● Ingenuity Rating: lowest 1 2 3 4 5 highest Comment:		
Science: ● Able to explain science behind experiment ● Encourages audience to hypothesize, observe and explain Rating: lowest 1 2 3 4 5 highest Comment:		
Thoroughness: ● Detailed with the why and what in each step ● Offers variations ● Shows depth Rating: lowest 1 2 3 highest Comment:		
Skill: ● Well-rehearsed ● Mastered the techniques and measurements used ● Knows how to handle exceptions Rating: lowest 1 2 3 highest Comment:		
Clarity: ● Well explained ● Neatly written and organized ● Easy to follow ● Engaging Rating: lowest 1 2 3 4 highest Comment:		
General Comments:		Order:

PROJECT:	TEAM:	JUDGE:
Creativity: ● Use of materials ● Design ● Adapts and Improvises ● Ingenuity Rating: lowest 1 2 3 4 5 highest Comment:		
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General Comments:		Order: