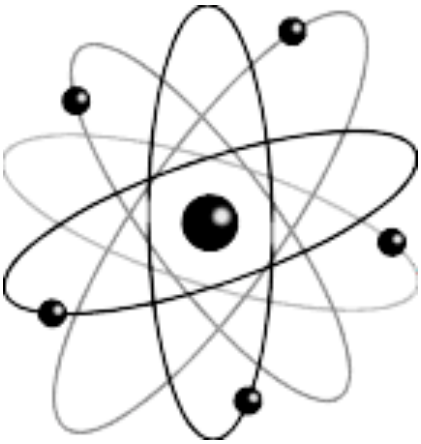
Health & Science

Science Fair



Info Packet

January 26th

8 – 1:30 pm & 6 – 7:30 pm

Dear Health & Science Parents:

The time for the annual Health & Science Science Fair is fast approaching. Since September, Health & Science students have been working to complete their science fair experiments, and they will be judged during school on January 26th. We would like to celebrate the students' hard work and excellent learning after the judging is over. We would like to invite you to this exhibition of all of the HS2 science fair projects on **January 26th, 2011 from 6:00 pm until 7:30 pm.**

The first hour will be an informal period for students, parents, teachers, and other community members to look at the displays students have made. During this first hour, there will be shorter assigned times when students will be asked to stand by their boards to answer questions and explain their projects informally to others.

At 7:00, we will meet in the cafeteria to hand out awards. The awards available this year are exciting in that they all allow students winning the awards will go on to higher fairs. 6th graders can continue onto the Washington County Science Fair for 1st through 6th graders. The Washington County Science Fair is linked to the Oregon State Fair that occurs each summer in Salem. 6th, 7th and 8th graders have the opportunity to go onto either the Beaverton School District Fair or the Northwest Science Expo. The Northwest Science Expo is linked to the national system of science fairs, and allows for awards of cash, prizes, and promotion to the national fair. These are exciting opportunities for our students to continue to excel in science.

Please make sure that you have marked January 26th HS2 Science Fair on your calendar.

Thank you for your continued support,

Curtis Semana
Assistant Principal
Health and Science High School

Display Board Info

Basics:

- Choose a catchy, attention-grabbing title that accurately summarizes your research. The title should be big and easily read from across the room.
- Organize your information like a newspaper so that your audience can quickly follow the thread of your experiment by reading from top to bottom, then left to right.
- Include the most important information for your project: Abstract, Rationale, Question and/or purpose, hypothesis, variables, a 1-page review of your background research, the most important parts of your tables, **GRAPHS**, discussion, conclusion, and error analysis.
- Avoid clutter. Use at most three or four colors.
- Label all data tables, charts, graphs, or photographs you use. **All photographs need a photo credit for the person who took the photo. Any people in the picture other than you must have a waiver signed.**
- Take advantage of the space on the table in front of your board by displaying your experimental apparatus or equipment (be sure to cover up any logos on the equipment) and your **lab notebook and lab report.**

Assembly and Supplies:

- Print out on white paper what you will attach to your board. Be sure to **proofread** each sheet before print it and before you attach it.
- Instead of regular paper, if you have it, use thicker cover stock or card stock. These heavier papers will wrinkle less when attached to your board, especially if you use a glue stick.
- Matte paper is preferable to glossy because it won't show as much glare—glare makes your board difficult to read.
- Glue sticks (use plenty) work well for attaching sheets of paper to your board. Use double-sided tape for items like photographs that may not stick with glue.
- Use color construction paper to add accents to your board. A common technique is to put sheets of construction paper behind the white paper containing your text.
- Use negative space to your advantage. Having things formatted so that they are not overwhelming to look at makes people want to read your board more. If they need more information than what is on your board, they can look in you lab report.

Things that are NOT Allowed at NWSE:

- Potentially hazardous devices (ex: mousetraps!) are not allowed. Hazardous devices must be removed from aparati that will be displayed.
- Identification of cooperating research institutions or schools may not be on poster display. That means **you cannot put your school name** or any logos (like MESA) on your display board. You can put your name on the board.
- **Brand names are not allowed in your display**. If you are displaying any equipment, be sure to cover up any logos on the equipment. The exception is middle school consumer product testing projects; you may use brand names on your board.

Size of the Board:

For NWSE and qualifying fairs, the **maximum** size for display boards

- Middle School Exhibits
  - 30 inches (76 centimeters) deep
  - 36 inches (91 centimeters) wide
  - 78 inches (198 centimeters) high from top of table

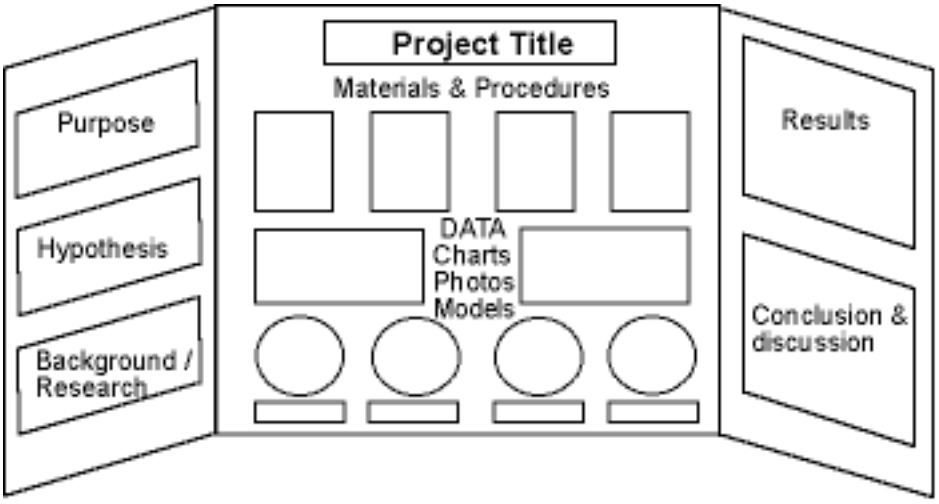
Fonts:

- Use a font size of at least 16 points for your main body text. Anything smaller is too hard to read.
- Stick with traditional fonts like Arial, Times New Roman, or similar typefaces. Don't use more than two or three different fonts on your board. Times New Roman for the body and Arial for headings makes for a nice combination.
- Use *italics* or **bold** for emphasis, not for all your text.
- Don't use ALL CAPS; THEY ARE MUCH HARDER TO READ.

Font Size:

Item	**Font Size (points)**	**Comments**
Title	150+	You want your title to be visible from across a room!
Headings	32+	Should be easily readable from five feet away by someone just walking by.
Subheadings	20+	This text is smaller than headings, but more noticeable than main text size.
Main Body Text	16 18	This is a comfortable text size for someone who comes closer to read more.
Captions	12 16	It's OK to make these a bit smaller than the body text if necessary.

<u>Example</u> Display Board Layout:



Doing Your Science Fair Experiment

1. Be safe.
    a. Wear goggles and gloves when appropriate.
    b. Make sure there is an adult supervisor while you are conducting your experiment.
    c. If you are using chemicals, use them in a well ventilated area.
2. Take pictures and/or draw diagrams of your setup.
    a. These can be used in your report and on your display board, but there are a couple of rules you must follow.
        i. You must give credit to the person who took the picture in your report and/or on your display board.
        ii. Anyone in the picture must be properly following safety guidelines.
        iii. If there is anyone in the picture other than you that is recognizable, then you must get their written permission to have their picture displayed in your report or on your board.
        iv. If the person in the picture is a minor, you must also get their legal guardian's written permission to have their picture displayed.
    b. Adding labels, measurements, and legends to pictures and diagrams is helpful too.
3. Use your science journal to write down all of the procedures you do in detail as you do them.
    a. Even if it seems like you "messed up," you probably still learned something from it and devised a better method to get better results. This is important information later when you are writing your analysis and conclusions.
4. Use your science journal to write down all the data you collect, even if it "didn't work."
    a. Make a table before you start the experiment that is neat and organized. Then, when you are running the experiment you can quickly write down your data in a way that is legible and helpful.
    b. Often times data that you collect during an experiment that doesn't seem to work is really the best data you got. It may show something contrary to your hypothesis, but sometimes experiments turn to that way. Also, this data can be helpful to you when you are trying to make the next trials in the experiment better for what you are looking for.
5. Other than your numerical data, use your science journal to take notes on what happened in each trial. The more notes you have, the easier writing your analysis and conclusion will be.
    a. What might have been some sources of error?
    b. What odd things happened?
    c. What time differences happened?
    d. Was there anything that could have affected your data?
6. Anytime you write something down, write the date a time too. If some of your data comes up "strange" you can then see if the date and time (or things happening during that date and time) could have affected your data.

HS2 Science Fair Rules

(Detailed explanations below table)

Type of Project	Allowed	Allowed with Restrictions	Not Allowed
Involving Humans	Passive Observation		Ingesting anything, exercise, surveys
Involving Hazardous Chemicals, Activities and Devices		Risk Assessment must be conducted and included in procedures	Firearms, explosives, Class III & IV lasers, DEA controlled substances, prescription drugs, radiation
Involving Vertebrate Animals	Investigations involving observation of zoo animals, wild animals or pets	Behavioral studies of pets	Drastic changes in home environment; negative reinforcement
Involving Human or Animal Tissues	hair, sterilized teeth, meat or meat by-products purchased from a store, fossils, prepared fixed tissue slides, and the researcher's own nail clippings		Anything else
Involving Microbe Cultures	Yogurt cultures, Baker's and Brewer's yeast purchased from a store.	Unknowns from the environment, BSL-1 microbes	BSL-2 or higher microbes

Rules for HS2 Science Fair Projects

While some projects are not allowed under HS2 Science Fair Rules, students may still do research involving some of these situations if they receive pre-approval from their local IRB/SRC, follow Intel ISEF rules and submit all the required Intel ISEF forms. Please read through the ISEF rules before experimentation begins. Most ISEF forms need to be filled out and signed before experimentation begins.

Human Subjects

Acceptable projects include observational studies of legal public behavior of children and/or adults where there is NO interaction between the researcher (or someone acting on behalf of the researcher) and her subjects. For example, it is acceptable for a student to observe how many children play on the monkey bars vs. the slide at the park but it is not allowed if a student observes how many children play on the monkey bars vs. the slide at the park and then asks the children why they prefer one over the other. It is also unacceptable for a teacher to administer a survey or a test to her class on behalf of the researcher. It is acceptable to use data from the internet that is publicly available for analysis.

Not allowed under HS2 Science Fair Rules

Eating or drinking anything, including food, candy or water
Exercise studies
Surveys
Consumer products testing involving human subjects
Taking fingerprints

Hazardous Chemicals, Activities and Devices

Projects involving the use of hazardous chemicals and devices and involvement in hazardous activities require direct supervision by a parent or teacher. A risk assessment needs to be included in the project procedures including the following information:

1. List the hazardous chemicals, activities or devices that will be used.
2. Identify the risks involved.
3. Describe the safety precautions used to reduce risk.
4. Describe the disposal methods used for hazardous chemicals.

Hazardous chemicals include acids, bases, and alcohol and tobacco products. This includes household items like bleach, over-the-counter medicines and fertilizers.

Hazardous activities are those that involve a level of risk above and beyond that encountered in the student's everyday life. When in doubt do a risk assessment.

Hazardous devices include laboratory equipment that requires a moderate to high level of expertise to ensure its safe usage.

Not Allowed

Firearms and explosives
Class III and IV lasers
DEA controlled substances
Prescription drugs
Radiation

Microbe Cultures

The following microbes are approved without special precautions, but tasting the products as part of the experiment is not allowed:

- Baker's yeast purchased from a store
- Brewer's yeast purchased from a store
- Studies involving Lactobacillus, Bacillus thurgensis, nitrogen-fixing, oil-eating bacteria, slime mold and algae-eating bacteria introduced into their natural environment. These are not exempt from special precautions if cultured in a petri dish environment that could potentially be contaminated.

The following microbe projects can only be conducted at school or a research lab:

- **Decomposition** or **mold** growth experiments
- **Unknown specimens** obtained from the environment, not a living creature
- **Bio Safety Level 1 microbes** specifically listed below

Risk Assessments

The following risk assessment questions need to be included in the project procedures for every microbe culture experiment:

1. What types of microbes are involved?
2. What risks are involved?
3. What safety precautions will be used to reduce risk?
4. What disposal methods will be used?
5. Where will the research be conducted?

Regarding Unknown Specimens

Studies involving unknown microorganisms present a challenge because the presence, concentration and pathogenicity of possible agents are unknown. In science fair projects these studies typically involve the collection and culturing of microorganisms from the environment like soil, household surfaces, skin, etc. Culturing from places where dangerous microbes are expected to exist is a bad idea. Do NOT swab bathrooms or litter boxes.

Research with unknown microorganisms can be treated as a BSL-1 study under the following conditions:

1. The organism **is cultured** in a plastic Petri dish or other standard non-breakable container **and sealed**. Other acceptable containment includes petro film and doubled heavy-duty (2-ply) sealed bags.
2. The experiment involves only procedures in which the Petri dish remains sealed throughout the experiment, for example counting the presence of organisms or colonies.

3. The sealed Petri dish is disposed of in the appropriate manner under the supervision of the teacher or Designated Supervisor.
4. All BSL-1 containment procedures are followed.

Not Allowed: opening a culture for identification, sub-culturing or isolation.

Regarding Bio Safety Level 1 Microbes

Bio Safety Level 1 (BSL-1) microbes specifically listed below may be used as long as all BSL-1 containment precautions are followed.

BSL-1 risk group contains biological agents that pose low risk to personnel and the environment. These agents are highly unlikely to cause disease in healthy laboratory workers, animals or plants. The agents require BioSafety Level 1 containment. Approved BSL-1 organisms are: *Aspergillus niger, Escherichia coli strain K12, Micrococcus leuteus, Neurospora crassa, Pseudomonas fluorescens, Agrobacterium tumifaciens, Bacillus subtilis, and Serratia marcescens*.

BSL-1 containment is normally found in water-testing laboratories, in high schools, and in colleges teaching introductory microbiology classes. Work is done on an open bench or in a fume hood. Standard microbiological practices are used when working in the laboratory. Decontamination can be achieved by treating with chemical disinfectants or by steam autoclaving. Lab coats are required and gloves recommended. The laboratory work is supervised by an individual with general training in microbiology or a related science.

Vertebrate Animals

Two types of Vertebrate animal projects are allowed using the MS Super EZ form.

1. Observational studies of behavior of animals in their habitat, including the home for pets and the zoo and nature for wild animals, where there is NO intervention or treatment.
   OK: a student observes goldfish behavior during feeding time vs. non-feeding times on a normal feeding schedule. **Not allowed**: a student observes how the goldfish react to living in a dark closet.
2. Behavioral projects for pets involving doing things that pets experience in everyday life such as a new food dish, supplemental treats (following label recommendations), a new toy. **OK**: a student observes which colored dish a dog prefers to drink from. **Not allowed**: adding food coloring to water to see which color the dog prefers.

Pets are defined as animals not acquired specifically for a research project.

Human and Vertebrate Animal Tissue

The following human and animal tissues are allowed using the MS Super EZ form.

- The researcher's OWN nail clippings
- Hair
- Sterilized teeth
- Meat or meat by-products obtained from a food store, with receipt and not consumed
- Fossils
- Prepared fixed tissue slides

OK: a student compares strength and texture of clippings of her own hair after it is soaked in different concentrations of salt solution. **Not allowed**: a student compares shape and size of teeth from a variety of "road-kill" animals or ALL other projects involving human and animal tissue, including those involving organs, non-sterilized teeth, blood and other body fluids.